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Structural Design of Antenna Frame and Analysis of CL&P Tower

AT&T Mobility Site Ref: CT2117

CL&P Structure No. 783

78’ Electric Transmission Lattice Tower

200 Edgemark Acres
Meriden, CT

CENTEK Project No. 13305

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Prepared for:
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Introduction

The purpose of this report is to design a proposed antenna mast and analyze the existing 78' CL&P tower located at 200 Edgemark Acres in Meriden, CT for the proposed AT&T Mobility antenna installation.

The proposed loads consist of the following:

- **AT&T MOBILITY (Proposed):**

  Antennas: Six (6) Andrew CCI HPA-65R-BUU-H8 panel antennas, three (3) Andrew CCI OPA-65R-LCUU-H8 panel antennas and eighteen (18) CCI BPDB7823VG12A TMA's mounted on a Site-Pro Ultra-Low Profile Platform p/n ULP12-496 with a RAD center elevation of 88-ft above grade.
  Coax Cables: Thirty-six (36) 1-5/8" ∅ coax cables running on two (2) legs of the existing tower as indicated in section 4 of this report.

Primary assumptions used in the analysis

- Allowable steel stresses are defined by AISC-ASD 9th edition for design of the ANTENNA Mast and antenna supporting elements.
- ASCE Manual No. 10-97, "Design of Latticed Steel Transmission Structures", defines allowable steel stresses for evaluation of the CL&P utility tower.
- All utility tower members are adequately protected to prevent corrosion of steel members.
- All proposed antenna mounts are modeled as listed above.
- All coaxial cable will be installed as indicated in Section 4 of this report.
- ANTENNA Mast will be properly installed and maintained.
- No residual stresses exist due to incorrect tower erection.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds conform to the requirements of AWS D1.1.
- ANTENNA Mast and utility tower will be in plumb condition.
- Utility tower was properly installed and maintained and all members were properly designed, detailed, fabricated, and installed and have been properly maintained since erection.
- Any deviation from the analyzed loading will require a new analysis for verification of structural adequacy.

A n a l y s i s

Structural design of the antenna frame was independently completed using the current version of RISA-3D computer program licensed to CENTEK Engineering, Inc.

The antenna mast consisting of a HSS12.5”x0.625” conforming to ASTM A500 Grade 42 (Fy = 42ksi) mounted on a 18’-6” antenna frame connected at eight points to the existing tower was analyzed for its ability to resist loads prescribed by the TIA/EIA standard. Section 5 of this report details these gravity and lateral wind loads. NESC prescribed loads were also applied to the antenna mast in order to obtain reactions needed for analyzing the CL&P tower structure. These loads are developed in Section 7 of this report. Load cases and combinations used in RISA-3D for TIA/EIA loading and for NESC/NU loading are listed in report Sections 6 and 8, respectively.

An envelope solution was first made to determine maximum and minimum forces, stresses, and deflections to confirm the selected section as adequate. Additional analyses were then made to determine the NESC forces to be applied to the CL&P tower structure.

The RISA-3D program contains a library of all AISC shapes and corresponding section properties are computed and applied directly within the program. The program’s Steel Code Check option was also utilized. The forces calculated in RISA-3D using NESC guidelines were then applied to the CL&P tower using PLS-Tower. Maximum usage for the tower was calculated considering the additional forces from the mast and associated appurtenances.

D e s i g n   B a s i s

Our analysis was performed in accordance with EIA-222-F-1996, ASCE Manual No. 10-97, “Design of Latticed Steel Transmission Structures”, NESC C2-2007 and Northeast Utilities Design Criteria.

The CL&P tower structure, considering existing and future conductor and shield wire loading, with the proposed antenna mast was analyzed under two conditions:

- UTILITY TOWER ANALYSIS

  The purpose of this analysis is to determine the adequacy of the existing utility structure to support the proposed antenna loads. The loading and design requirements were analyzed in accordance with the NU Design Criteria Table, NESC C2-2007 ~ Construction Grade B, and ASCE Manual No. 10-97, “Design of Latticed Steel Transmission Structures”.

  Load cases considered:

  Load Case 1: NESC Heavy
  Wind Pressure.................................. 4.0 psf
  Radial Ice Thickness............................ 0.5”
  Vertical Overload Capacity Factor............ 1.50
  Wind Overload Capacity Factor................ 2.50
  Wire Tension Overload Capacity Factor...... 1.65

  Load Case 2: NESC Extreme
  Wind Speed..................................... 110 mph (1)
  Radial Ice Thickness............................ 0”

  Note 1: NESC C2-2007, Section25, Rule 250C: Extreme Wind Loading, 1.25 x Gust Response Factor (wind speed: 3-second gust)

- ANTENNA FRAME ANALYSIS

ANTENNA mast, appurtenances and connections to the utility tower were analyzed and designed in accordance with the NU Design Criteria Table, TIA/EIA-222-F, and AISC-ASD standards.

Load cases considered:

Load Case 1:
Wind Speed……………………………….. 85 mph [2]
Radial Ice Thickness………………………. 0”

Load Case 2:
Wind Pressure.……………………………. 75% of 85 mph wind pressure
Radial Ice Thickness……………………….. 0.5”

Note 2: Per NU Mast Design Criteria Exception 1.

Results

- ANTENNA FRAME ASSEMBLY

The antenna frame was determined to be structurally **adequate**.

Member	Stress Ratio (% of capacity)	Result
HSS12.5”x0.625” Mast	44.2%	**PASS**
HSS 6x6x3/8 Brace	89.0%	**PASS**
Mast Connection to CL&P Tower	81.6% [1]	**PASS**

Note 1 – 1/3 increase in allowable stress not used for connection to tower per OTRM 059.

- UTILITY TOWER

This analysis finds that the subject utility structure is adequate to support the existing ANTENNA mast and related appurtenances. The tower stresses meet the requirements set forth by the ASCE Manual No. 10-97, “Design of Latticed Steel Transmission Structures”, for the applied NESC Heavy and Hi-Wind load cases. The detailed analysis results are provided in Section 9 of this report. The analysis results are summarized as follows:

With the proposed tower reinforcements detailed in Section 4 of this report a maximum usage of **96.54%** occurs in the utility tower under the **NESC Extreme** loading condition.

TOWER SECTION:

The utility structure **with the proposed tower reinforcements detailed in Section 4 of this report** was found to be within allowable limits.

Tower Member	Stress Ratio (% of capacity)	Result
Angle Leg13X	96.54%	**PASS**

- FOUNDATION AND ANCHORS

The existing foundation consists of four (4) 16-inx25-in tapering to 28-inx25-in x 6.25-ft long reinforced concrete piers on four (4) 4-ft-6-in square x 2-ft thick reinforced concrete pads. The base of the tower is connected to the foundation by one (1) anchor stub per leg. Foundation information was obtained from a foundation exploration conducted on May 5, 2014.

BASE REACTIONS:

From PLS-Tower analysis of CL&P tower based on NESC/NU prescribed loads.

Load Case	Shear	Uplift	Compression
NESC Heavy Wind	25.29 kips	26.19 kips	80.81 kips
NESC Extreme Wind	60.66 kips	1113.12 kips	130.05 kips

Note 1 – 10% increase to be applied to the above tower base reactions for foundation verification per OTRM 051
Note 1 – Reactions are combined leg reactions.

FOUNDATION:

The foundation **with the proposed reinforcements detailed in Section 4 of this report** was found to be within allowable limits.

Foundation	Design Limit	Allowable Limit	Proposed Loading (2)	Result
Reinforced Conc. Pad and Pier	Overturning	1.0 FS (1)	1.66 FS (1)	**PASS**

Note 1: FS denotes Factor of Safety
Note 2: 10% increase to PLS base reactions used in foundation analysis per OTRM 051.

Conclusions and Recommendations

This analysis shows that the subject utility tower **with the proposed reinforcements outlined below and detailed in Section 4 of this report is adequate** to support the proposed AT&T equipment installaiton.

- Replacement of sixteen (8) L1-3/4x1-3/4x3/16 diagonal members with L2x2x5/16.
- Replacement of two (2) L2x2x3/16 horizontal members with L2x2x1/4.
- Installation of one (1) 27'x27'x3.5' reinforced concrete mat.

The analysis is based, in part on the information provided to this office by Northeast Utilities and AT&T Mobility. If the existing conditions are different than the information in this report, CENTEK engineering, Inc. must be contacted for resolution of any potential issues.

Please feel free to call with any questions or comments.

Respectfully Submitted by:

Timothy J. Lynn, PE
Structural Engineer

STATE OF CONNECTICUT
TIMOTHY J. LYNN
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LICENSED
PROFESSIONAL ENGINEER

STANDARD CONDITIONS FOR FURNISHING OF PROFESSIONAL ENGINEERING SERVICES ON EXISTING STRUCTURES

All engineering services are performed on the basis that the information used is current and correct. This information may consist of, but is not necessarily limited to:

- Information supplied by the client regarding the structure itself, its foundations, the soil conditions, the antenna and feed line loading on the structure and its components, or other relevant information.

- Information from the field and/or drawings in the possession of CENTEK engineering, Inc. or generated by field inspections or measurements of the structure.

- It is the responsibility of the client to ensure that the information provided to CENTEK engineering, Inc. and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that all structures were constructed in accordance with the drawings and specifications and are in an un-corroded condition and have not deteriorated. It is therefore assumed that its capacity has not significantly changed from the "as new" condition.

- All services will be performed to the codes specified by the client, and we do not imply to meet any other codes or requirements unless explicitly agreed in writing. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes, the client shall specify the exact requirement. In the absence of information to the contrary, all work will be performed in accordance with the latest revision of ANSI/ASCE10 & ANSI/EIA-222.

- All services are performed, results obtained, and recommendations made in accordance with generally accepted engineering principles and practices. CENTEK engineering, Inc. is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.

GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM ~ RISA-3D

RISA-3D Structural Analysis Program is an integrated structural analysis and design software package for buildings, bridges, tower structures, etc.

Modeling Features:

- Comprehensive CAD-like graphic drawing/editing capabilities that let you draw, modify and load elements as well as snap, move, rotate, copy, mirror, scale, split, merge, mesh, delete, apply, etc.
- Versatile drawing grids (orthogonal, radial, skewed)
- Universal snaps and object snaps allow drawing without grids
- Versatile general truss generator
- Powerful graphic select/unselect tools including box, line, polygon, invert, criteria, spreadsheet selection, with locking
- Saved selections to quickly recall desired selections
- Modification tools that modify single items or entire selections
- Real spreadsheets with cut, paste, fill, math, sort, find, etc.
- Dynamic synchronization between spreadsheets and views so you can edit or view any data in the plotted views or in the spreadsheets
- Simultaneous view of multiple spreadsheets
- Constant in-stream error checking and data validation
- Unlimited undo/redo capability
- Generation templates for grids, disks, cylinders, cones, arcs, trusses, tanks, hydrostatic loads, etc.
- Support for all units systems & conversions at any time
- Automatic interaction with RISASection libraries
- Import DXF, RISA-2D, STAAD and ProSteel 3D files
- Export DXF, SDNF and ProSteel 3D files

Analysis Features:

- Static analysis and P-Delta effects
- Multiple simultaneous dynamic and response spectra analysis using Gupta, CQC or SRSS mode combinations
- Automatic inclusion of mass offset (5% or user defined) for dynamic analysis
- Physical member modeling that does not require members to be broken up at intermediate joints
- State of the art 3 or 4 node plate/shell elements
- High-end automatic mesh generation — draw a polygon with any number of sides to create a mesh of well-formed quadrilateral (NOT triangular) elements.
- Accurate analysis of tapered wide flanges - web, top and bottom flanges may all taper independently
- Automatic rigid diaphragm modeling
- Area loads with one-way or two-way distributions
- Multiple simultaneous moving loads with standard AASHTO loads and custom moving loads for bridges, cranes, etc.
- Torsional warping calculations for stiffness, stress and design
- Automatic Top of Member offset modeling
- Member end releases & rigid end offsets
- Joint master-slave assignments
- Joints detachable from diaphragms
- Enforced joint displacements
- 1-Way members, for tension only bracing, slipping, etc.

- 1-Way springs, for modeling soils and other effects
- Euler members that take compression up to their buckling load, then turn off.
- Stress calculations on any arbitrary shape
- Inactive members, plates, and diaphragms allows you to quickly remove parts of structures from consideration
- Story drift calculations provide relative drift and ratio to height
- Automatic self-weight calculations for members and plates
- Automatic subgrade soil spring generator

Graphics Features:

- Unlimited simultaneous model view windows
- Extraordinary “true to scale” rendering, even when drawing
- High-speed redraw algorithm for instant refreshing
- Dynamic scrolling stops right where you want
- Plot & print virtually everything with color coding & labeling
- Rotate, zoom, pan, scroll and snap views
- Saved views to quickly restore frequent or desired views
- Full render or wire-frame animations of deflected model and dynamic mode shapes with frame and speed control
- Animation of moving loads with speed control
- High quality customizable graphics printing

Design Features:

- Designs concrete, hot rolled steel, cold formed steel and wood
- ACI 1999/2002, BS 8110-97, CSA A23.3-94, IS456:2000,EC 2-1992 with consistent bar sizes through adjacent spans
- Exact integration of concrete stress distributions using parabolic or rectangular stress blocks
- Concrete beam detailing (Rectangular, T and L)
- Concrete column interaction diagrams
- Steel Design Codes: AISC ASD 9th, LRFD 2nd & 3rd, HSS Specification, CAN/CSA-S16.1-1994 & 2004, BS 5950-1-2000, IS 800-1984, Euro 3-1993 including local shape databases
- AISI 1999 cold formed steel design
- NDS 1991/1997/2001 wood design, including Structural Composite Lumber, multi-ply, full sawn
- Automatic spectra generation for UBC 1997, IBC 2000/2003
- Generation of load combinations: ASCE, UBC, IBC, BOCA, SBC, ACI
- Unbraced lengths for physical members that recognize connecting elements and full lengths of members
- Automatic approximation of K factors
- Tapered wide flange design with either ASD or LRFD codes
- Optimization of member sizes for all materials and all design codes, controlled by standard or user-defined lists of available sizes and criteria such as maximum depths
- Automatic calculation of custom shape properties
- Steel Shapes: AISC, HSS, CAN, ARBED, British, Euro, Indian, Chilean
- Light Gage Shapes: AISI, SSMA, Dale / Incor, Dietrich, Marino\WARE
- Wood Shapes: Complete NDS species/grade database
- Full seamless integration with RISAFoot (Ver 2 or better) for advanced footing design and detailing
- Plate force summation tool

Results Features:

- Graphic presentation of color-coded results and plotted designs
- Color contours of plate stresses and forces with quadratic smoothing, the contours may also be animated
- Spreadsheet results with sorting and filtering of: reactions, member & joint deflections, beam & plate forces/stresses, optimized sizes, code designs, concrete reinforcing, material takeoffs, frequencies and mode shapes
- Standard and user-defined reports
- Graphic member detail reports with force/stress/deflection diagrams and detailed design calculations and expanded diagrams that display magnitudes at any dialed location
- Saved solutions quickly restore analysis and design results.

GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM ~ PLS-TOWER

PLS-TOWER is a Microsoft Windows program for the analysis and design of steel latticed towers used in electric power lines or communication facilities. Both self-supporting and guyed towers can be modeled. The program performs design checks of structures under user specified loads. For electric power structures it can also calculate maximum allowable wind and weight spans and interaction diagrams between different ratios of allowable wind and weight spans.

Modeling Features:

- Powerful graphics module (stress usages shown in different colors)
- Graphical selection of joints and members allows graphical editing and checking
- Towers can be shown as lines, wire frames or can be rendered as 3-d polygon surfaces
- Can extract geometry and connectivity information from a DXF CAD drawing
- CAD design drawings, title blocks, drawing borders or photos can be tied to structure model
- XML based post processor interface
- Steel Detailing Neutral File (SDNF) export to link with detailing packages
- Can link directly to line design program PLS-CADD
- Automatic generation of structure files for PLS-CADD
- Databases of steel angles, rounds, bolts, guys, etc.
- Automatic generation of joints and members by symmetries and interpolations
- Automated mast generation (quickly builds model for towers that have regular repeating sections) via graphical copy/paste
- Steel angles and rounds modeled either as truss, beam or tension-only elements
- Guys are easily handled (can be modeled as exact cable elements)

Analysis Features:

- Automatic handling of tension-only members
- Automatic distribution of loads in 2-part suspension insulators (v-strings, horizontal vees, etc.)
- Automatic calculation of tower dead, ice, and wind loads as well as drag coefficients according to:
    - ASCE 74-1991
    - NESC 2002
    - NESC 2007
    - IEC 60826:2003
    - EN50341-1:2001 (CENELEC)
    - EN50341-3-9:2001 (UK NNA)
    - EN50341-3-17:2001 (Portugal NNA)
    - ESAA C(b)1-2003 (Australia)
    - TPNZ (New Zealand)
    - REE (Spain)
    - EIA/TIA 222-F
    - ANSI/TIA 222-G
    - CSA S37-01
- Automated microwave antenna loading as per EIA/TIA 222-F and ANSI/TIA 222-G
- Minimization of problems caused by unstable joints and mechanisms
- Automatic bandwidth minimization and ability to solve large problems
- Design checks according to (other standards can be added easily):
    - ASCE Standard 10-90

- AS 3995 (Australian Standard 3995)
- BS 8100 (British Standard 8100)
- EN50341-1 (CENELEC, both empirical and analytical methods are available)
- ECCS 1985
- NGT-ECCS
- PN-90/B-03200
- EIA/TIA 222-F
- ANSI/TIA 222-G
- CSA S37-01
- EDF/RTE Resal
- IS 802 (India Standard 802)

Results Features:

- Design summaries printed for each group of members
- Easy to interpret text, spreadsheet and graphics design summaries
- Automatic determination of allowable wind and weight spans
- Automatic determination of interaction diagrams between allowable wind and weight spans
- Capability to batch run multiple tower configurations and consolidate the results
- Automated optimum angle member size selection and bolt quantity determination

Tool for interactive angle member sizing and bolt quantity determination.

Criteria for Design of PCS Facilities On or Extending Above Metal Electric Transmission Towers & Analysis of Transmission Towers Supporting PCS Masts [1]

Introduction

This criteria is the result from an evaluation of the methods and loadings specified by the separate standards, which are used in designing telecommunications towers and electric transmission towers. That evaluation is detailed elsewhere, but in summary; the methods and loadings are significantly different. This criteria specifies the manner in which the appropriate standard is used to design PCS facilities including masts and brackets (hereafter referred to as “masts”), and to evaluate the electric transmission towers to support PCS masts. The intent is to achieve an equivalent level of safety and security under the extreme design conditions expected in Connecticut and Massachusetts.

ANSI Standard TIA/EIA-222 (Rev. F) covering the design of telecommunications structures specifies a working strength/allowable stress design approach. This approach applies the loads from extreme weather loading conditions, and designs the structure so that it does not exceed some defined percentage of failure strength (allowable stress).

ANSI Standard C2-2007 (National Electrical Safety Code) covering the design of electric transmission metal structures is based upon an ultimate strength/yield stress design approach. This approach applies a multiplier (overload capacity factor) to the loads possible from extreme weather loading conditions, and designs the structure so that it does not exceed its ultimate strength (yield stress).

Each standard defines the details of how loads are to be calculated differently. Most of the NU effort in “unifying” both codes was to establish what level of strength each approach would provide, and then increasing the appropriate elements of each to achieve a similar level of security under extreme weather loadings.

Two extreme weather conditions are considered. The first is an extreme wind condition (hurricane) based upon a 50-year recurrence (2% annual probability). The second is a winter condition combining wind and ice loadings.

The following sections describe the design criteria for any PCS mast extending above the top of an electric transmission tower, and the analysis criteria for evaluating the loads on the transmission tower from such a mast from the lower portions of such a mast, and loads on the pre-existing electric lower portions of such a mast, and loads on the pre-existing electric transmission tower and the conductors it supports.

Note 1: Prepared from documentation provide from Northeast Utilities.

P C S M a s t

The PCS facility (mast, external cable/trays, including the initial and any planned future support platforms, antennas, etc. extending the full height above the top level of the electric transmission structure) shall be designed in accordance with the provisions of TIA/EIA-222 (Rev. F) with two exceptions:

1. An 85 mph extreme wind speed shall be used for locations in all counties throughout the NU system.
2. The allowable stress increase of TIA Section 3.1.1.1 is allowed for the mast section, but is disallowed for the mast to structure connection design.

   The combined wind and ice condition shall consider ½" radial ice in combination with the wind load (0.75 Wi) as specified in TIA section 2.3.16.

E L E C T R I C T R A N S M I S S I O N T O W E R

The electric transmission tower shall be analyzed using yield stress theory in accordance with the attached table titled "NU Design Criteria". This specifies uniform loadings (different from the TIA loadings) on the each of the following components of the installed facility:

- PCS mast for its total height above ground level, including the initial and planned future support platforms, antennas, etc. above the top of an electric transmission structure.
- Conductors are related devices and hardware.
- Electric transmission structure. The loads from the PCS facility and from the electric conductors shall be applied to the structure at conductor and PCS mast attachment points, where those load transfer to the tower.

The uniform loadings and factors specified for the above components in the table are based upon the National Electrical Safety Code 2007 Edition Extreme Wind (Rule 250C) and Combined Ice and Wind (Rule 250B-Heavy) Loadings. These provide equivalent loadings compared to TIA and its loads and factors with the exceptions noted above. (Note that the NESC does not require the projected wind surfaces of structures and equipment to be increased by the ice covering.)

In the event that the electric transmission tower is not sufficient to support the additional loadings of the PCS mast, reinforcement will be necessary to upgrade the strength of the overstressed members.

Attachment A

NU Design Criteria

Condition	Code	Item	Basic Wind Speed	Pressure	Height Factor	Gust Factor	Load or Stress Factor	Force Coef - Shape Factor
			V (MPH)	Q (PSF)	Kz	Gh		
Ice Condition	TIA/EIA	Antenna Mount	TIA	TIA (.75Wi)	TIA	TIA	TIA, Section 3.1.1.1 disallowed for connection design	TIA
Ice Condition	NESC Heavy	Tower/Pole Analysis with antennas extending above top of Tower/Pole (Yield Stress)	------	4	1.00	1.00	2.50	1.6 Flat Surfaces 1.3 Round Surfaces
Ice Condition	NESC Heavy	Tower/Pole Analysis with Antennas below top of Tower/Pole (on two faces)	-----	4	1.00	1.00	2.50	1.6 Flat Surfaces 1.3 Round Surfaces
Ice Condition	NESC Heavy	Conductors:	Conductor loads provided by NU					
High Wind Condtion	TIA/EIA	Antenna Mount	85	TIA	TIA	TIA	TIA, Section 3.1.1.1 disallowed for connection design	TIA
High Wind Condtion	NESC Extreme Wind	Tower/Pole Analysis with antennas extending above top of Tower/Pole	Use NESC C2-2007, Section 25, Rule 250C: Extreme Wind Loading 1.25 x Gust Response Factor Height above ground level based on top of Mast/Antenna					1.6 Flat Surfaces 1.3 Round Surfaces
High Wind Condtion	NESC Extreme Wind	Tower/Pole Analysis with Antennas below top of Tower/Pole	Use NESC C2-2007, Section 25, Rule 250C: Extreme Wind Loading Height above ground level based on top of Tower/Pole					1.6 Flat Surfaces 1.3 Round Surfaces
High Wind Condtion	NESC Extreme Wind	Conductors:	Conductor loads provided by NU					
NESC Extreme Ice with Wind Conditon*		Tower/Pole Analysis with antennas extending above top of Tower/Pole	Use NESC C2-2007, Section 25, Rule 250D: Extreme Ice with Wind Loading 4PSF Wind Load 1.25 x Gust Response Factor Height above ground level based on top of Mast/Antenna					1.6 Flat Surfaces 1.3 Round Surfaces
NESC Extreme Ice with Wind Conditon*		Tower/Pole Analysis with Antennas below top of Tower/Pole	Use NESC C2-2007, Section 25, Rule 250D: Extreme Ice with Wind Loading 4PSF Wind Load Height above ground level based on top of Tower/Pole					1.6 Flat Surfaces 1.3 Round Surfaces
NESC Extreme Ice with Wind Conditon*		Conductors:	Conductor loads provided by NU					

* Only for Structures Installed after 2007

Shape Factor Criteria shall be per TIA Shape Factors.

2) STEP 2 - The electric transmission structure analysis and evaluation shall be performed in accordance with NESC requirements and shall include the mast and antenna loads determined from NESC applied loading conditions (not TIA/EIA Loads) on the structure and mount as specified below, and shall include the wireless communication mast and antenna loads per NESC criteria)

The structure shall be analyzed using yield stress theory in accordance with Attachment A, "NU Design Criteria." This specifies uniform loadings (different from the TIA loadings) on each of the following components of the installed facility:

a) Wireless communication mast for its total height above ground level, including the initial and any planned future equipment (Support Platforms, Antennas, TMA's etc.) above the top of an electric transmission structure.
b) Conductors and related devices and hardware (wire loads will be provided by NU).
c) Electric Transmission Structure
   i) The loads from the wireless communication equipment components based on NESC and NU Criteria in Attachment A, and from the electric conductors shall be applied to the structure at conductor and wireless communication mast attachment points, where those loads transfer to the tower.
   ii) Shape Factor Multiplier:

NESC Structure Shape	Cd
Polyround (for polygonal steel poles)	1.3
Flat	1.6
Open Lattice	3.2

   iii) When Coaxial Cables are mounted along side the pole structure, the shape multiplier shall be:

Mount Type	Cable Cd	Pole Cd
Coaxial Cables on outside periphery (One layer)	1.45	1.45
Coaxial Cables mounted on stand offs	1.6	1.3

d) The uniform loadings and factors specified for the above components in Attachment A, "NU Design Criteria" are based upon the National Electric Safety Code 2007 Edition Extreme Wind (Rule 250C) and Combined Ice and Wind (Rule 250B-Heavy) Loadings. These provide equivalent loadings compared to the TIA and its loads and factors with the exceptions noted above.

   Note: The NESC does not require ice load be included in the supporting structure. (Ice on conductors and shield wire only, and NU will provide these loads).
e) Mast reaction loads shall be evaluated for local effects on the transmission structure members at the attachment points.

CONDUCTOR

Northeast Utilities System

Job :	AT&T Meriden 1690 line EAST Circuit			**Page**	of
		Spec. Number		**Sheet**	of
Description:		**Computed by**		**Date**	6/13/08
		Checked by		**Date**	

INPUT DATA

TOWER ID: 783, East Circuit

Structure Height (ft) : 78

Wind Zone : Central CT (green)

Wind Speed : 110 mph

Tower Type : ○ Suspension ◉ Strain

Extreme Wind Model : PCS Addition

CONDUCTOR

~~Shield Wire~~ Properties:

	BACK	AHEAD
NAME =	*4/0 Cu*	*4/0 Cu*
DESCRIPTION =	4/0	4/0
STRANDING =	7.000 Cu	7.000 Cu
DIAMETER =	0.522 in	0.522 in
WEIGHT =	0.653 lb/ft	0.653 lb/ft

~~Conductor Properties:~~

		BACK	AHEAD		
NAME =		*NONE*	*NONE*		
Number of Conductors per phase	1	-	-	1	Number of Conductors per phase
DIAMETER =		0.000 in	0.000 in		
WEIGHT =		0.000 lb/ft	0.000 lb/ft		

Insulator Weight = 200 lbs

Broken Wire Side = AHEAD SPAN

Horizontal Line Tensions:

	COND. BACK		COND. AHEAD	
	~~Shield~~	~~Conductor~~	~~Shield~~	~~Conductor~~
NESC HEAVY =	4,500 ✓	na	4,500 ✓	na
EXTREME WIND =	3,831 ✓	na	3,796 ✓	na
LONG. WIND =	na	na	na	na
250D COMBINED =	na	na	na	na
NESC W/O OLF =	na	na	na	na
60 DEG F NO WIND =	1,849 ✓	na	1,876 ✓	na

Line Geometry:

					SUM
LINE ANGLE (deg) =	BACK:	0	AHEAD:	0	**0**
WIND SPAN (ft) =	BACK:	388 ✓	AHEAD:	327 ✓	**715**
WEIGHT SPAN (ft) =	BACK:	496 ✓	AHEAD:	471 ✓	**967**

Northeast Utilities System

				Page	of
Job :	AT&T Meriden 1690 line EAST Circuit	**Spec. Number**		**Sheet**	of
Description:		**Computed by**		**Date**	6/13/08
		Checked by		**Date**	

WIRE LOADING AT ATTACHMENTS

TOWER ID: 783, East Circuit

Wind Span =	715 ft
Weight Span =	967 ft
Total Angle =	0 degrees

Broken Wire Span =	AHEAD SPAN
Type of Insulator Attachment =	STRAIN

1. NESC RULE 250B Heavy Loading:

	INTACT CONDITION			BROKEN WIRE CONDITION		
	Horizontal	Longitudinal	Vertical	Horizontal	Longitudinal	Vertical
~~Shield Wire~~ =	906 lb	0 lb	1,870 lb	491 lb	7,425 lb	960 lb
Conductor =	~~#VALUE!~~	~~#VALUE!~~	~~1,051 lb~~	~~#VALUE!~~	~~#VALUE!~~	~~581 lb~~

2. NESC RULE 250C Transverse Extreme Wind Loading:

	Horizontal	Longitudinal	Vertical
~~Shield Wire~~ =	867 lb	35 lb	632 lb
Conductor =	~~#VALUE!~~	~~#VALUE!~~	~~400 lb~~

~~3. NESC RULE 250C Longitudinal Extreme Wind Loading:~~

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	632 lb
Conductor =	#VALUE!	#VALUE!	400 lb

~~4. NESC RULE 250D Extreme Ice & Wind Loading:~~

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	2,463 lb
Conductor =	#VALUE!	#VALUE!	1,603 lb

~~5. NESC RULE 250B w/o OLF's~~

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	1,247 lb
Conductor =	#VALUE!	#VALUE!	701 lb

6. 60 Deg. F, No Wind

	Horizontal	Longitudinal	Vertical
~~Shield Wire~~ =	0 lb	27 lb	632 lb
Conductor =	~~#VALUE!~~	~~#VALUE!~~	~~400 lb~~

~~7. Construction~~

	Horizontal	Longitudinal	Vertical
Shield Wire =	0 lb	41 lb	948 lb
Conductor =	#VALUE!	#VALUE!	600 lb

NOTE: All loads include required overload factors (OLF's).

Northeast Utilities System

SHIELD WIRE

Job :	AT&T Meriden 1690 line EAST Shield Wire		Page	of
Description:		Spec. Number	Sheet	of
		Computed by	Date	6/17/08
		Checked by	Date	

INPUT DATA

TOWER ID: 783, East Circuit

Structure Height (ft) : 78

Wind Zone : Central CT (green)

Wind Speed : 110 mph

Tower Type : ○ Suspension ◉ Strain

Extreme Wind Model : PCS Addition

Shield Wire Properties:

	BACK	AHEAD
NAME =	*11/32 CW*	*11/32 CW*
DESCRIPTION =	11/32	11/32
STRANDING =	7 #9 Cu Weld	7 #9 Cu Weld
DIAMETER =	0.343 in	0.343 in
WEIGHT =	0.257 lb/ft	0.257 lb/ft

Conductor Properties:

	BACK	AHEAD
NAME =	*NONE*	*NONE*
	-	-
DIAMETER =	0.000 in	0.000 in
WEIGHT =	0.000 lb/ft	0.000 lb/ft

Number of Conductors per phase (BACK): 1

Number of Conductors per phase (AHEAD): 1

Insulator Weight = 200 lbs

Broken Wire Side = AHEAD SPAN

Horizontal Line Tensions:

	BACK		AHEAD	
	Shield	~~Conductor~~	Shield	~~Conductor~~
NESC HEAVY =	3,600✓	na	3,600✓	na
EXTREME WIND =	2,800✓	na	2,806✓	na
LONG. WIND =	na	na	na	na
250D COMBINED =	na	na	na	na
NESC W/O OLF =	na	na	na	na
60 DEG F NO WIND =	1,011✓	na	1,098✓	na

Line Geometry:

					SUM
LINE ANGLE (deg) =	BACK:	0	AHEAD:	0	**0**
WIND SPAN (ft) =	BACK:	388✓	AHEAD:	327✓	**715**
WEIGHT SPAN (ft) =	BACK:	496✓	AHEAD:	471✓	**967**

Northeast Utilities System

				Page	of
Job :	AT&T Meriden 1690 line EAST Shield Wire	Spec. Number		Sheet	of
Description:		Computed by		Date	6/17/08
		Checked by		Date	

WIRE LOADING AT ATTACHMENTS

TOWER ID: 783, East Circuit

Wind Span =	715	ft
Weight Span =	967	ft
Total Angle =	0	degrees

Broken Wire Span =	AHEAD SPAN
Type of Insulator Attachment =	STRAIN

1. NESC RULE 250B Heavy Loading:

	INTACT CONDITION			BROKEN WIRE CONDITION		
	Horizontal	Longitudinal	Vertical	Horizontal	Longitudinal	Vertical
Shield Wire =	800 lb	0 lb	1,133 lb	434 lb	5,940 lb	582 lb
~~Conductor =~~	~~#VALUE!~~	~~#VALUE!~~	~~1,051 lb~~	~~#VALUE!~~	~~#VALUE!~~	~~501 lb~~

2. NESC RULE 250C Transverse Extreme Wind Loading:

	Horizontal	Longitudinal	Vertical
Shield Wire =	569 lb	6 lb	249 lb
~~Conductor~~	~~#VALUE!~~	~~#VALUE!~~	~~400 lb~~

~~3. NESC RULE 250C Longitudinal Extreme Wind Loading:~~

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	249 lb
Conductor =	#VALUE!	#VALUE!	400 lb

~~4. NESC RULE 250D Extreme Ice & Wind Loading:~~

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	1,864 lb
Conductor =	#VALUE!	#VALUE!	1,603 lb

~~5. NESC RULE 250B w/o OLF's~~

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	756 lb
Conductor =	#VALUE!	#VALUE!	701 lb

6. 60 Deg. F, No Wind

	Horizontal	Longitudinal	Vertical
Shield Wire =	0 lb	87 lb	249 lb
~~Conductor =~~	~~#VALUE!~~	~~#VALUE!~~	~~400 lb~~

~~7. Construction~~

	Horizontal	Longitudinal	Vertical
Shield Wire =	0 lb	131 lb	373 lb
Conductor =	#VALUE!	#VALUE!	600 lb

NOTE: All loads include required overload factors (OLF's).

Northeast Utilities System

CONDUCTOR

Job :	AT&T Meriden 1690 line WEST Conductor		Page	of
Description:		Spec. Number	Sheet	of
		Computed by	Date	6/17/08
		Checked by	Date	

INPUT DATA

TOWER ID: 783, WEST Circuit

Structure Height (ft) : 78

Wind Zone : Central CT (green)

Wind Speed : 110 mph

Tower Type : (●) Suspension ( ) Strain

Extreme Wind Model : PCS Addition

CONDUCTOR ~~Shield Wire~~ Properties:

	BACK	AHEAD
NAME =	*4/0 Cu*	*4/0 Cu*
DESCRIPTION =	4/0	4/0
STRANDING =	7.000 Cu	7.000 Cu
DIAMETER =	0.522 in	0.522 in
WEIGHT =	0.653 lb/ft	0.653 lb/ft

~~Conductor Properties:~~

	BACK	AHEAD
NAME =	*NONE*	*NONE*
	-	-
DIAMETER =	0.000 in	0.000 in
WEIGHT =	0.000 lb/ft	0.000 lb/ft

	Back	Ahead
Number of Conductors per phase	1	1

Insulator Weight = 200 lbs

Broken Wire Side = AHEAD SPAN

Horizontal Line Tensions:

	BACK COND. ~~Shield~~	BACK ~~Conductor~~	AHEAD COND ~~Shield~~	AHEAD ~~Conductor~~
NESC HEAVY =	4,500 ✓	na	4,500 ✓	na
EXTREME WIND =	3,814 ✓	na	3,814 ✓	na
LONG. WIND =	na	na	na	na
250D COMBINED =	na	na	na	na
NESC W/O OLF =	na	na	na	na
60 DEG F NO WIND =	1,861 ✓	na	1,861 ✓	na

Line Geometry:

					SUM
LINE ANGLE (deg) =	BACK:	0	AHEAD:	0	**0**
WIND SPAN (ft) =	BACK:	357 ✓	AHEAD:	357 ✓	**714**
WEIGHT SPAN (ft) =	BACK:	484 ✓	AHEAD:	484 ✓	**968**

![Northeast Utilities System]

Northeast Utilities System

Job :	AT&T Meriden 1690 line WEST Conductor			Page	of
Description:		Spec. Number		Sheet	of
		Computed by		Date	6/17/08
		Checked by		Date	

WIRE LOADING AT ATTACHMENTS

TOWER ID: 783, WEST Circuit

Wind Span =	714 ft
Weight Span =	968 ft
Total Angle =	0 degrees

Broken Wire Span =	AHEAD SPAN
Type of Insulator Attachment =	SUSPENSION

1. NESC RULE 250B Heavy Loading:

	INTACT CONDITION			BROKEN WIRE CONDITION		
	Horizontal	Longitudinal	Vertical	Horizontal	Longitudinal	Vertical
~~Shield Wire~~ =	906 lb	0 lb	1,871 lb	453 lb	5,175 lb	936 lb
Conductor =	~~#VALUE!~~	~~#VALUE!~~	~~1,051 lb~~	~~#VALUE!~~	~~#VALUE!~~	~~526 lb~~

2. NESC RULE 250C Transverse Extreme Wind Loading:

	Horizontal	Longitudinal	Vertical
~~Shield Wire~~ =	873 lb	0 lb	632 lb
Conductor =	~~#VALUE!~~	~~#VALUE!~~	~~400 lb~~

~~3. NESC RULE 250C Longitudinal Extreme Wind Loading:~~

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	632 lb
Conductor =	#VALUE!	#VALUE!	400 lb

~~4. NESC RULE 250D Extreme Ice & Wind Loading:~~

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	2,465 lb
Conductor =	#VALUE!	#VALUE!	1,604 lb

~~5. NESC RULE 250B w/o OLF's~~

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	1,248 lb
Conductor =	#VALUE!	#VALUE!	701 lb

6. 60 Deg. F. No Wind

	Horizontal	Longitudinal	Vertical
~~Shield Wire~~ =	0 lb	0 lb	632 lb
Conductor =	~~#VALUE!~~	~~#VALUE!~~	~~400 lb~~

~~7. Construction~~

	Horizontal	Longitudinal	Vertical
Shield Wire =	0 lb	0 lb	949 lb
Conductor =	#VALUE!	#VALUE!	600 lb

NOTE: All loads include required overload factors (OLF's).

SHIELD WIRE

Northeast Utilities System

Job :	AT&T Meriden 1690 line WEST Shield Wire			Page	of
Description:		Spec. Number		Sheet	of
		Computed by		Date	6/17/08
		Checked by		Date	

INPUT DATA

TOWER ID: 783, WEST Circuit

Structure Height (ft) : 78

Wind Zone : Central CT (green)

Wind Speed : 110 mph

Tower Type : (●) Suspension ( ) Strain

Extreme Wind Model : PCS Addition

Shield Wire Properties:

	BACK	AHEAD
NAME =	*11/32 CW*	*11/32 CW*
DESCRIPTION =	11/32	11/32
STRANDING =	7 #9 Cu Weld	7 #9 Cu Weld
DIAMETER =	0.343 in	0.343 in
WEIGHT =	0.257 lb/ft	0.257 lb/ft

~~Conductor Properties:~~

	BACK	AHEAD	
NAME =	*NONE*	*NONE*	
Number of Conductors per phase: 1	-	-	1 Number of Conductors per phase
DIAMETER =	0.000 in	0.000 in	
WEIGHT =	0.000 lb/ft	0.000 lb/ft	

Insulator Weight = 200 lbs

Broken Wire Side = AHEAD SPAN

Horizontal Line Tensions:

	BACK Shield	BACK ~~Conductor~~	AHEAD Shield	AHEAD ~~Conductor~~
NESC HEAVY =	3,600	na	3,600	na
EXTREME WIND =	2,803	na	2,803	na
LONG. WIND =	na	na	na	na
250D COMBINED =	na	na	na	na
NESC W/O OLF =	na	na	na	na
60 DEG F NO WIND =	1,049	na	1,049	na

Line Geometry:

					SUM
LINE ANGLE (deg) =	BACK:	0	AHEAD:	0	**0**
WIND SPAN (ft) =	BACK:	357	AHEAD:	357	**714**
WEIGHT SPAN (ft) =	BACK:	484	AHEAD:	484	**968**

Northeast Utilities System

Job :	AT&T Meriden 1690 line WEST Shield Wire	Spec. Number		Page	of
Description:		Computed by		Sheet	of
		Checked by		Date	6/17/08
				Date	

WIRE LOADING AT ATTACHMENTS

TOWER ID: 783, WEST Circuit

Wind Span =	714	ft
Weight Span =	968	ft
Total Angle =	0	degrees

Broken Wire Span =	AHEAD SPAN
Type of Insulator Attachment =	SUSPENSION

1. NESC RULE 250B Heavy Loading:

	INTACT CONDITION			BROKEN WIRE CONDITION		
	Horizontal	Longitudinal	Vertical	Horizontal	Longitudinal	Vertical
Shield Wire =	799 lb	0 lb	1,134 lb	400 lb	4,140 lb	567 lb
~~Conductor~~	~~#VALUE!~~	~~#VALUE!~~	~~1,051 lb~~	~~#VALUE!~~	~~#VALUE!~~	~~526 lb~~

2. NESC RULE 250C Transverse Extreme Wind Loading:

	Horizontal	Longitudinal	Vertical
Shield Wire =	574 lb	0 lb	249 lb
~~Conductor~~	~~#VALUE!~~	~~#VALUE!~~	~~400 lb~~

~~3. NESC RULE 250C Longitudinal Extreme Wind Loading:~~

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	249 lb
Conductor =	#VALUE!	#VALUE!	400 lb

~~4. NESC RULE 250D Extreme Ice & Wind Loading:~~

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	1,865 lb
Conductor =	#VALUE!	#VALUE!	1,604 lb

~~5. NESC RULE 250B w/o OLF's~~

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	756 lb
Conductor =	#VALUE!	#VALUE!	701 lb

6. 60 Deg. F, No Wind

	Horizontal	Longitudinal	Vertical
Shield Wire =	0 lb	0 lb	249 lb
~~Conductor~~	~~#VALUE!~~	~~#VALUE!~~	~~400 lb~~

~~7. Construction~~

	Horizontal	Longitudinal	Vertical
Shield Wire =	0 lb	0 lb	373 lb
Conductor =	#VALUE!	#VALUE!	600 lb

NOTE: All loads include required overload factors (OLF's).

Connecticut Light & Power

TOWER REINFORCEMENT DESIGN

CL&P STRUCT. NO. 783
200 EDGEMARK ACRES
MERIDEN, CT 06451

VICINITY MAP

NORTH

PROJECT SUMMARY

SITE ADDRESS:	200 EDGEMARK ACRES MERIDEN, CT 06451
PROJECT COORDINATES:	LAT: 41°-31'-51.70N LON: 72°-50'-33.58W ELEV:±348' AMSL
CL&P STRUCT NO:	783
CL&P CONTACT:	ROBERT GRAY 860.665.3175
AT&T SITE REF.:	CT2117
AT&T CONTACT:	DAVID VIVIAN 413.218.5042
ANTENNA CL HEIGHT:	88'-0"
ENGINEER OF RECORD:	CENTEK ENGINEERING, INC. 63-2 NORTH BRANFORD ROAD BRANFORD, CT 06405
CENTEK CONTACT:	CARLO F. CENTORE, PE 203.488.0580 ext. 122

SHEET INDEX

DESIGNED BY:	TJL
DRAWN BY:	TJL
CHK'D BY:	CFC

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
4	10/6/14	TJL	CFC	REVISED FRAME
3	8/27/14	TJL	CFC	CONSTRUCTION
2	7/1/14	TJL	CFC	CONSTRUCTION
1	6/4/14	TJL	CFC	ISSUED FOR NU REVIEW
A	1/7/14	TJL	CFC	ISSUED FOR NU REVIEW

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200 EDGEMARK ACRES
MERIDEN, CT 06451

DATE:	1/7/14
SCALE:	AS SHOWN
JOB NO.	13305

TITLE SHEET

SHEET NO.
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Sheet No. 1 of 11

DESIGN BASIS

1. GOVERNING CODE: 2003 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2005 CT STATE BUILDING CODE AND 2009 AMENDMENTS.

2. TIA/EIA-222-F-1996, ASCE MANUAL NO. 72 – "DESIGN OF STEEL TRANSMISSION POLE STRUCTURES SECOND EDITION", NESC C2-2007 AND NORTHEAST UTILITIES DESIGN CRITERIA.

3. DESIGN CRITERIA

   WIND LOAD: (PCS MAST)
   BASIC WIND SPEED (V) =85 MPH (FASTEST MILE); BASED ON TIA/EIA-222F AND NU MAST DESIGN CRITERIA EXCEPTION 1.

   WIND LOAD: (UTILITY POLE & FOUNDATION)
   BASIC WIND SPEED (V) =110 MPH (3-SECOND GUST) BASED ON NESC C2-2007, SECTION 25 RULE 250C.

GENERAL NOTES

1. REFER TO STRUCTURAL ANALYSIS AND REINFORCEMENT DESIGN PREPARED BY CENTEK ENGINEERING, INC., FOR AT&T DATED 10/6/14.

2. TOWER GEOMETRY AND STRUCTURE MEMBER SIZES WERE OBTAINED FROM THE ORIGINAL TOWER DESIGN DOCUMENTS PREPARED BY BLACK-KNOX DIVISION DRAWING NOS. P-51656, P-52562, P-51382, AND P-51925 THRU 51928 CIRCA 1948.

3. THE TEMPORARY DETACHMENT AND/OR REPLACEMENT OF TOWER MEMBERS SHALL BE DONE ONE AT A TIME AND SHALL BE CONDUCTED ON DAYS WITH LESS THAN 15 MPH WIND PRESENT. NO MEMBER SHALL BE LEFT DISCONNECTED FOR THE NEXT WORKING DAY.

4. ALL STEEL REINFORCEMENT SHOWN HEREIN APPLIES TO ALL SIDES OF THE TOWER.

5. ALL REPLACEMENT STEEL MEMBERS SHALL BE INSTALLED WITH A325-N BOLTS (SIZE TO MATCH EXISTING). UNLESS OTHERWISE NOTED BELOW.

6. THE TOWER STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER REINFORCEMENTS ARE COMPLETE. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE ERECTION PROCEDURE & SEQUENCE AND TO INSURE THE SAFETY OF THE TOWER STRUCTURE AND ITS COMPONENT PARTS DURING ERECTION. THIS INCLUDES PROVIDING AND MAINTAINING ADEQUATE SHORING, BRACING, UNDERPINNING, TEMPORARY ANCHORS, GUYING, BARRICADES, ETC. AS MAY BE REQUIRED FOR THE PROTECTION OF EXISTING PROPERTY, CONSTRUCTION WORKERS, AND FOR PUBLIC SAFETY. MAINTAIN EXISTING SITE OPERATIONS AND COORDINATE WORK WITH TOWER OWNER.

7. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE GOVERNING BUILDING CODE.

8. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS SCOPE OF WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.

9. BEFORE BEGINNING THE WORK, THE CONTRACTOR IS RESPONSIBLE FOR MAKING SUCH INVESTIGATIONS CONCERNING PHYSICAL CONDITIONS (SURFACE AND SUBSURFACE) AT OR CONTIGUOUS TO THE SITE WHICH MAY AFFECT PERFORMANCE AND COST OF THE WORK. THIS INCLUDES VERIFYING ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA. CONTRACTOR SHALL TAKE FIELD MEASUREMENTS NECESSARY TO ASSURE PROPER FIT OF ALL FINISHED WORK.

10. TOWER REINFORCEMENTS SHALL BE CONDUCTED BY FIELD CREWS EXPERIENCED IN THE ASSEMBLY AND ERECTION OF TRANSMISSION STRUCTURES. ALL SAFETY PROCEDURES, RIGGING AND ERECTION METHODS SHALL BE STANDARD TO THE INDUSTRY AND IN COMPLIANCE WITH OSHA.

11. EXISTING COAXIAL CABLES AND ALL ACCESSORIES SHALL BE RELOCATED AS NECESSARY AND REINSTALLED BY THE CONTRACTOR WITHOUT INTERRUPTION IN SERVICE WHERE THEY ARE IN CONFLICT WITH THE TOWER REINFORCEMENT WORK.

12. IF ANY FIELD CONDITIONS EXIST WHICH PRECLUDE COMPLIANCE WITH THE DRAWINGS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND SHALL PROCEED WITH AFFECTED WORK AFTER CONFLICT IS SATISFACTORILY RESOLVED.

13. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.

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REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
4	10/6/14	TJL	CFC	REVISED FRAME
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SCALE: AS SHOWN
JOB NO. 13305

DESIGN BASIS AND GENERAL NOTES

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EARTHWORK NOTES

1. COMPACTED GRAVEL FILL SHALL BE FURNISHED AND PLACED AS A FOUNDATION FOR STRUCTURES, WHERE SHOWN ON THE CONTRACT DRAWINGS OR DIRECTED BY THE ENGINEER.

2. CRUSHED STONE FILL SHALL BE PLACED IN 12" MAX. LIFTS AND CONSOLIDATED USING A HAND OPERATED VIBRATORY PLATE COMPACTOR WITH A MINIMUM OF 2 PASSES OF COMPACTOR PER LIFT.

3. COMPACTED GRAVEL FILL TO BE WELL GRADED BANK RUN GRAVEL MEETING THE FOLLOWING GRADATION REQUIREMENTS:

SIEVE DESIGNATION	% PASSING
1 ½"	100
No. 4	40–70
No. 100	5–20
No. 200	4–8

4. CRUSHED STONE TO BE UNIFORMLY GRADED, CLEAN, HARD PROCESS AGGREGATE MEETING THE FOLLOWING GRADATION REQUIREMENTS:

SIEVE DESIGNATION	% PASSING
1"	100
¾"	90–100
½"	0–15
⅜"	0–5

5. SELECT BACKFILL FOR FOUNDATION WALLS SHALL BE FREE OF ORGANIC MATERIAL, TOPSOIL, DEBRIS AND BOULDERS LARGER THAN 6".

6. GRAVEL AND GRANULAR FILL SHALL BE INSTALLED IN 10" MAX. LIFTS. COMPACTED TO 95% MIN. AT MAX. DRY DENSITY.

7. NON WOVEN GEOTEXTILE FOR SEPARATION PURPOSES SHALL BE MIRAFI 140N, OR ENGINEER APPROVED EQUAL.

FOUNDATION CONSTRUCTION NOTES

1. ALL FOOTINGS SHALL BE PLACED ON SUITABLE, COMPACTED SOIL HAVING ADEQUATE BEARING CAPACITY AND FREE OF ORGANIC CONTENT, CLAY, OR OTHER UNSUITABLE MATERIAL. ADDITIONAL EXCAVATION MAY BE REQUIRED BELOW FOOTING ELEVATIONS INDICATED IF UNSUITABLE MATERIAL IS ENCOUNTERED.

2. SUBGRADE PREPARATION: IF UNSUITABLE SOIL IS ENCOUNTERED, REMOVE ALL UNSUITABLE MATERIALS FROM BELOW PROPOSED STRUCTURE FOUNDATIONS AND COMPACT EXPOSED SOIL SURFACES. PLACE AND COMPACT APPROVED GRAVEL FILL. PLACEMENT OF ALL COMPACTED FILL MUST BE UNDER SUPERVISION OF AN APPROVED TESTING LABORATORY. FILL SHALL BE COMPACTED IN LAYERS NOT TO EXCEED 10" BEFORE COMPACTION. DETERMINE MAXIMUM DRY DENSITY IN ACCORDANCE WITH ASTM D1557–70 AND MAKE ONE (1) FIELD DENSITY TEST IN ACCORDANCE WITH ASTM D2167–66 FOR EACH 50 CUBIC YARDS OF COMPACTED FILL. BUT NOT LESS THAN ONE (1) PER LAYER, TO INSURE COMPACTION TO 95% OF MAX. DRY DENSITY.

3. ALL SOIL SURROUNDING AND UNDER ALL FOOTINGS SHALL BE KEPT REASONABLY DRY AND PROTECTED FROM FREEZING AND FROST ACTION DURING THE COURSE OF CONSTRUCTION.

4. WHERE GROUNDWATER IS ENCOUNTERED, DEWATERING SHALL BE ACCOMPLISHED CONTINUOUSLY AND COMPLETELY DURING FOUNDATION CONSTRUCTION. PROVIDE CRUSHED STONE AS REQUIRED TO STABILIZE FOOTING SUBGRADE.

5. ALL FOOTINGS ARE TO REST ON FIRM SOIL, REGARDLESS OF ELEVATIONS SHOWN ON THE DRAWINGS, BUT IN NO CASE MAY FOOTING ELEVATIONS BE HIGHER THAN INDICATED ON THE FOUNDATION PLAN, UNLESS SPECIFICALLY DIRECTED BY THE ENGINEER.

6. FOUNDATION WATERPROOFING AND DAMPPROOFING SHALL COMPLY WITH BUILDING CODE REQUIREMENTS UNLESS A MORE SUBSTANTIAL SYSTEM IS INDICATED OR SPECIFIED.

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EARTHWORK AND FOUNDATION CONSTRUCTION NOTES

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CONCRETE CONSTRUCTION

1. CONCRETE CONSTRUCTION SHALL CONFORM TO THE FOLLOWING STANDARDS:

   ACI 211 – STANDARD PRACTICE FOR SELECTING PROPORTIONS FOR NORMAL AND HEAVYWEIGHT CONCRETE.

   ACI 301 – SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS.

   ACI 302 – GUIDE FOR CONCRETE FLOOR AND SLAB CONSTRUCTION

   ACI 304 – RECOMMENDED PRACTICE FOR MEASURING, MIXING, TRANSPORTING, AND PLACING CONCRETE.

   ACI 306.1 – STANDARD SPECIFICATION FOR COLD WEATHER CONCRETING

   ACI 318 – BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE.

2. CONCRETE SHALL BE AIR ENTRAINED AND SHALL DEVELOP COMPRESSIVE STRENGTH IN 28 DAYS AS FOLLOWS:

   ALL CONCRETE 3,500 PSI

3. REINFORCING STEEL SHALL BE 60,000 PSI YIELD STRENGTH.

4. ALL DETAILING, FABRICATION, AND ERECTION OF REINFORCING BARS, UNLESS OTHERWISE NOTED, MUST FOLLOW THE LATEST ACI CODE AND LATEST ACI "MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES".

5. CONCRETE COVER OVER REINFORCING SHALL BE 3 INCHES.

6. NO STEEL WIRE, METAL FORM TIES, OR ANY OTHER METAL SHALL REMAIN WITHIN THE REQUIRED COVER OF ANY CONCRETE SURFACE.

7. ALL REINFORCEMENT SHALL BE CONTINUOUS. SPLICES WILL NOT BE ALLOWED.

8. NO TACK WELDING OF REINFORCING WILL BE PERMITTED.

9. NO CALCIUM CHLORIDE OR ADMIXTURES CONTAINING MORE THAN 1 % CHLORIDE BY WEIGHT OF ADMIXTURE SHALL BE USED IN THE CONCRETE.

10. TOP OF FOOTING SURFACES SHALL RECEIVE A UNIFORM FLOAT FINISH. CURE FOOTING SURFACE WITH SONNEBORN KURE-N-SEAL WB OR APPROVED EQUAL, APPLIED AS RECOMMENDED BY MANUFACTURER.

11. <u>PREPARATION OF SURFACES WHERE NEW CONCRETE WILL INTERFACE WITH EXISTING CAISSON:</u>
    THE PERIMETER OF THE EXISTING CAISSON SHALL BE THOROUGHLY CLEANED OF ALL DIRT AND DELETERIOUS MATERIALS PRIOR TO APPLICATION OF BONDING AGENT. CONTRACTOR SHALL NOTIFY NORTHEAST UTILITIES 24 HOURS IN ADVANCE OF CLEANING.

    SIKADUR 32, HI-MOD OR ENGINEER APPROVED EQUAL SHALL BE APPLIED, IN STRICT ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS, TO ALL INTERFACING SURFACES BEFORE CONCRETE IS PLACED.

    CAULK JOINT BETWEEN EXISTING CONCRETE PIER AND NEW CONCRETE WITH SIKAFLEX 1-A BY SIKA CORP. OR ENGINEER APRROVED EQUAL.

    SUBMIT MANUFACTURER'S PRODUCT SPECIFICATION DATA AND INSTALLATION INSTRUCTIONS FOR REVIEW AND APPROVAL BY OWNER.

12. NEW CONCRETE FOOTING SHALL BE ALLOWED TO CURE AT LEAST 14 DAYS BEFORE WIRELESS ANTENNA MOUNT, ANTENNAS, AND CABLES ARE INSTALLED.

13. INSPECTION AND TESTING OF CONCRETE WORK SHALL BE PERFORMED BY AN INDEPENDENT TESTING LABORATORY, APPROVED AND PAID BY THE OWNER. THE INSPECTOR SHALL OBSERVE THE CONDITION OF SOILS AND FORMWORK BEFORE FOOTINGS ARE PLACED, SIZE, SPACING AND LOCATION OF REINFORCEMENT, AND PLACEMENT OF CONCRETE.

14. THE TESTING COMPANY SHALL ALSO OBTAIN A MINIMUM OF THREE (3) COMPRESSIVE STRENGTH TEST SPECIMENS FOR EACH CONCRETE MIX DESIGN. ONE SPECIMEN TESTED AT 7 DAYS, ONE AT 28 DAYS, AND ONE HELD IN RESERVE FOR FUTURE TESTING, IF NEEDED.

15. FOUR COPIES OF ALL INSPECTION TEST REPORTS SHALL BE SUBMITTED TO THE OWNER WITHIN TEN (10) WORKING DAYS OF THE DATE OF INSPECTION.

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4	10/6/14	TJL	CFC	REVISED FRAME
3	8/27/14	TJL	CFC	CONSTRUCTION
2	7/1/14	TJL	CFC	CONSTRUCTION
1	6/4/14	TJL	CFC	ISSUED FOR NU REVIEW
A	1/7/14	TJL	CFC	ISSUED FOR NU REVIEW

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CONCRETE CONSTRUCTION NOTES

SHEET NO.
N-3

STRUCTURAL STEEL

1. ALL STRUCTURAL STEEL IS DESIGNED BY ALLOWABLE STRESS DESIGN (ASD).

2. MATERIAL SPECIFICATIONS

   A. STRUCTURAL STEEL (W SHAPES)---ASTM A992 (FY = 50 KSI)
   B. STRUCTURAL STEEL (OTHER SHAPES)---ASTM A36 (FY = 36 KSI).
   C. STRUCTURAL HSS (RECTANGULAR SHAPES)---ASTM A500 GRADE B, (FY = 46 KSI)
   D. STRUCTURAL HSS (ROUND SHAPES)---ASTM A500 GRADE B, (FY = 42 KSI)
   E. PIPE---ASTM A53 GRADE B (FY = 35 KSI)

3. FASTENER SPECIFICATIONS

   A. CONNECTION BOLTS---ASTM A325-N, UNLESS OTHERWISE SCHEDULED.
   B. U-BOLTS---ASTM A307
   C. ANCHOR RODS---ASTM F1554
   D. WELDING ELECTRODES---ASTM E70XX FOR A36 & A572_GR50 STEELS, ASTM E80XX FOR A572_GR65 STEEL.

4. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE ENGINEER FOR REVIEW. SHOP DRAWINGS SHALL INCLUDE THE FOLLOWING: SECTION PROFILES, SIZES, CONNECTION ATTACHMENTS, REINFORCING, ANCHORAGE, SIZE AND TYPE OF FASTENERS AND ACCESSORIES. INCLUDE ERECTION DRAWINGS, ELEVATIONS AND DETAILS.

5. STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST PROVISIONS OF AISC MANUAL OF STEEL CONSTRUCTION.

6. PROVIDE ALL PLATES, CLIP ANGLES, CLOSURE PIECES, STRAP ANCHORS, MISCELLANEOUS PIECES AND HOLES REQUIRED TO COMPLETE THE STRUCTURE.

7. FIT AND SHOP ASSEMBLE FABRICATIONS IN THE LARGEST PRACTICAL SECTIONS FOR DELIVERY TO SITE.

8. INSTALL FABRICATIONS PLUMB AND LEVEL, ACCURATELY FITTED, AND FREE FROM DISTORTIONS OR DEFECTS.

9. AFTER ERECTION OF STRUCTURES, TOUCHUP ALL WELDS, ABRASIONS AND NON-GALVANIZED SURFACES WITH A 95% ORGANIC ZINC RICH PAINT IN ACCORDANCE WITH ASTM 780.

10. ALL STEEL MATERIAL (EXPOSED TO WEATHER) SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT DIPPED GALVANIZED) COATINGS" ON IRONS AND STEEL PRODUCTS.

11. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC COATING (HOT-DIP) ON IRON AND STEEL HARDWARE".

12. CONTRACTOR SHALL COMPLY WITH AWS CODE FOR PROCEDURES APPEARANCE AND QUALITY OF WELDS, AND WELDING PROCESSES SHALL BE QUALIFIED IN ACCORDANCE WITH AWS "STANDARD QUALIFICATION PROCEDURES". ALL WELDING SHALL BE DONE USING THE SCHEDULED ELECTRODES AND WELDING SHALL CONFORM TO AISC AND D1.1 WHERE FILLET WELD SIZES ARE NOT SHOWN, PROVIDE THE MINIMUM SIZE PER TABLET J2.4 IN THE AISC "MANUAL OF STEEL CONSTRUCTION" 9TH EDITION. AT THE COMPLETION OF WELDING, ALL DAMAGE TO GALVANIZED COATING SHALL BE REPAIRED.

13. THE ENGINEER SHALL BE NOTIFIED OF ANY INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NON CONFORMING MATERIALS OR CONDITIONS TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE ENGINEER REVIEW.

14. CONNECTION ANGLES SHALL HAVE A MINIMUM THICKNESS OF 1/4 INCHES.

15. STRUCTURAL CONNECTION BOLTS SHALL CONFORM TO ASTM A325. ALL BOLTS SHALL BE 3/4" DIAMETER MINIMUM AND SHALL HAVE A MINIMUM OF TWO BOLTS, UNLESS OTHERWISE ON THE DRAWINGS.

16. LOCK WASHER ARE NOT PERMITTED FOR A325 BOLTED STEEL ASSEMBLIES.

17. SHOP CONNECTIONS SHALL BE WELDED OR HIGH STRENGTH BOLTED.

18. MILL BEARING ENDS OF COLUMNS, STIFFENERS, AND OTHER BEARING SURFACES TO TRANSFER LOAD OVER ENTIRE CROSS SECTION.

19. FABRICATE BEAMS WITH MILL CAMBER UP.

20. LEVEL AND PLUMB INDIVIDUAL MEMBERS OF THE STRUCTURE TO AN ACCURACY OF 1:500, BUT NOT TO EXCEED 1/4" IN THE FULL HEIGHT OF THE COLUMN.

21. COMMENCEMENT OF STRUCTURAL STEEL WORK WITHOUT NOTIFYING THE ENGINEER OF ANY DISCREPANCIES WILL BE CONSIDERED ACCEPTANCE OF PRECEDING WORK.

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STRUCTURAL NOTES

SHEET NO.
N-4
Sheet No. 5 of 11

MODIFICATION INSPECTION REPORT REQUIREMENTS

PRE-CONSTUCTION		DURING CONSTRUCTION		POST-CONSTRUCTION	
SCHEDULED ITEM	REPORT ITEM	SCHEDULED ITEM	REPORT ITEM	SCHEDULED ITEM	REPORT ITEM
X	EOR MODIFICATION INSPECTION DRAWING	X	FOUNDATIONS	X	MODIFICATION INSPECTOR RECORD REDLINE DRAWING
X	EOR APPROVED SHOP DRAWINGS	X	EARTHWORK: BACKFILL MATERIAL & COMPACTION	–	POST–INSTALLED ANCHOR ROD PULL–OUT TEST
–	EOR APPROVED POST–INSTALLED ANCHOR MPII	X	REBAR & FORMWORK GEOMETRY VERIFICATION	X	PHOTOGRAPHS
–	FABRICATION INSPECTION	X	CONCRETE TESTING		
–	FABRICATOR CERTIFIED WELDER INSPECTION	X	STEEL INSPECTION		
X	MATERIAL CERTIFICATIONS	–	POST INSTALLED ANCHOR ROD VERIFICATION		
		–	BASE PLATE GROUT VERIFICATION		
		–	CONTRACTOR'S CERTIFIED WELD INSPECTION		
		X	ON–SITE COLD GALVANIZING VERIFICATION		
		X	CONTRACTOR AS–BUILT REDLINE DRAWINGS		

NOTES:
1. REFER TO MODIFICATION INSPECTION NOTES FOR ADDITIONAL REQUIREMENTS
2. "X" DENOTES DOCUMENT REQUIRED FOR INCLUSION IN MODIFICATION INSPECTION FINAL REPORT.
3. "–" DENOTES DOCUMENT NOT REQUIRED FOR INCLUSION IN MODIFICATION INSPECTION FINAL REPORT.
4. EOR – ENGINEER OF RECORD
4. MPII – "MANUFACTURER'S PRINTED INSTALLATION GUIDELINES"

GENERAL

1. THE MODIFICATION INSPECTION IS A VISUAL INSPECTION OF STRUCTURAL MODIFICATIONS, TO INCLUDE A REVIEW AND COMPILATION OF SPECIFIED SUBMITTALS AND CONSTRUCTION INSPECTIONS, AS AN ASSURANCE OF COMPLIANCE WITH THE CONSTRUCTION DOCUMENTS PREPARED UNDER THE DIRECTION OF THE ENGINEER OF RECORD (EOR).

2. THE MODIFICATION INSPECTION IS TO CONFIRM INSTALLATION CONFIGURATION AND GENERAL WORKMANSHIP AND IS NOT A REVIEW OF THE MODIFICATION DESIGN. OWNERSHIP OF THE MODIFICATION DESIGN EFFECTIVENESS AND INTENT RESIDES WITH THE ENGINEER OF RECORD.

3. TO ENSURE COMPLIANCE WITH THE MODIFICATION INSPECTION REQUIREMENTS THE GENERAL CONTRACTOR (GC) AND THE MODIFICATION INSPECTOR (MI) COMMENCE COMMUNICATION UPON AUTHORIZATION TO PROCEED BY THE CLIENT. EACH PARTY SHALL BE PROACTIVE IN CONTACTING THE OTHER. THE EOR SHALL BE CONTACTED IF SPECIFIC GC/MI CONTACT INFORMATION IS NOT MADE AVAILABLE.

4. THE GC SHALL PROVIDE THE MI WITH A MINIMUM OF 5 BUSINESS DAYS NOTICE OF IMPENDING INSPECTIONS.

5. WHEN POSSIBLE, THE GC AND MI SHALL BE ON SITE DURING THE MODIFICATION INSPECTION TO HAVE ANY NOTED DEFICIENCIES ADDRESSED DURING THE INITIAL MODIFICATION INSPECTION.

MODIFICATION INSPECTOR (MI)

1. THE MI SHALL CONTACT THE GC UPON AUTHORIZATION BY THE CLIENT TO:

   – REVIEW THE MODIFICATION INSPECTION REPORT REQUIREMENTS.
   – WORK WITH THE GC IN DEVELOPMENT OF A SCHEDULE FOR ON–SITE INSPECTIONS.
   – DISCUSS CRITICAL INSPECTIONS AND PROJECT CONCERNS.

2. THE MI IS RESPONSIBLE FOR COLLECTION OF ALL INSPECTION AND TEST REPORTS, REVIEWING REPORTS FOR ADHERENCE TO THE CONTRACT DOCUMENTS, CONDUCTING ON–SITE INSPECTIONS AND COMPILATION & SUBMISSION OF THE MODIFICATION INSPECTION REPORT TO THE CLIENT AND THE EOR.

GENERAL CONTRACTOR (GC)

1. THE GC IS REQUIRED TO CONTACT THE GC UPON AUTHORIZATION TO PROCEED WITH CONSTRUCTION BY THE CLIENT TO:

   – REVIEW THE MODIFICATION INSPECTION REPORT REQUIREMENTS.
   – WORK WITH THE MI IN DEVELOPMENT OF A SCHEDULE FOR ON–SITE INSPECTIONS.
   – DISCUSS CRITICAL INSPECTIONS AND PROJECT CONCERNS.

2. THE GC IS RESPONSIBLE FOR COORDINATING AND SCHEDULING IN ADVANCE ALL REQUIRED INSPECTIONS AND TESTS WITH THE MI.

CORRECTION OF FAILING MODIFICATION INSPECTION

1. SHOULD THE STRUCTURAL MODIFICATION NOT COMPLY WITH THE REQUIREMENTS OF THE CONSTRUCTION DOCUMENTS, THE GC SHALL WORK WITH THE MODIFICATION INSPECTOR IN A VIABLE REMEDIATION PLAN AS FOLLOWS:

   – CORRECT ALL DEFICIENCIES TO COMPLY WITH THE CONTRACT DOCUMENTS AND COORDINATE WITH THE MI FOR A FOLLOW UP INSPECTION.
   – WITH CLIENT AUTHORIZATION, THE GC MAY WORK WITH THE EOR TO REANALYZE THE MODIFICATION USING THE AS–BUILT CONDITION.

REQUIRED PHOTOGRAPHS

1. THE GC AND MI SHALL AT MINIMUM PHOTO DOCUMENT THE FOLLOWING FOR INCLUSION IN THE MODIFICATION INSPECTION REPORT:

   – PRE–CONSTRUCTION: GENERAL CONDITION OF THE SITE.
   – DURING CONSTRUCTION: RAW MATERIALS, CRITICAL DETAILS, WELD PREPARATION, BOLT INSTALLATION & TORQUE, FINAL INSTALLED CONDITION & SURFACE COATING REPAIRS.
   – POST–CONSTRUCTION: FINAL CONDITION OF THE SITE

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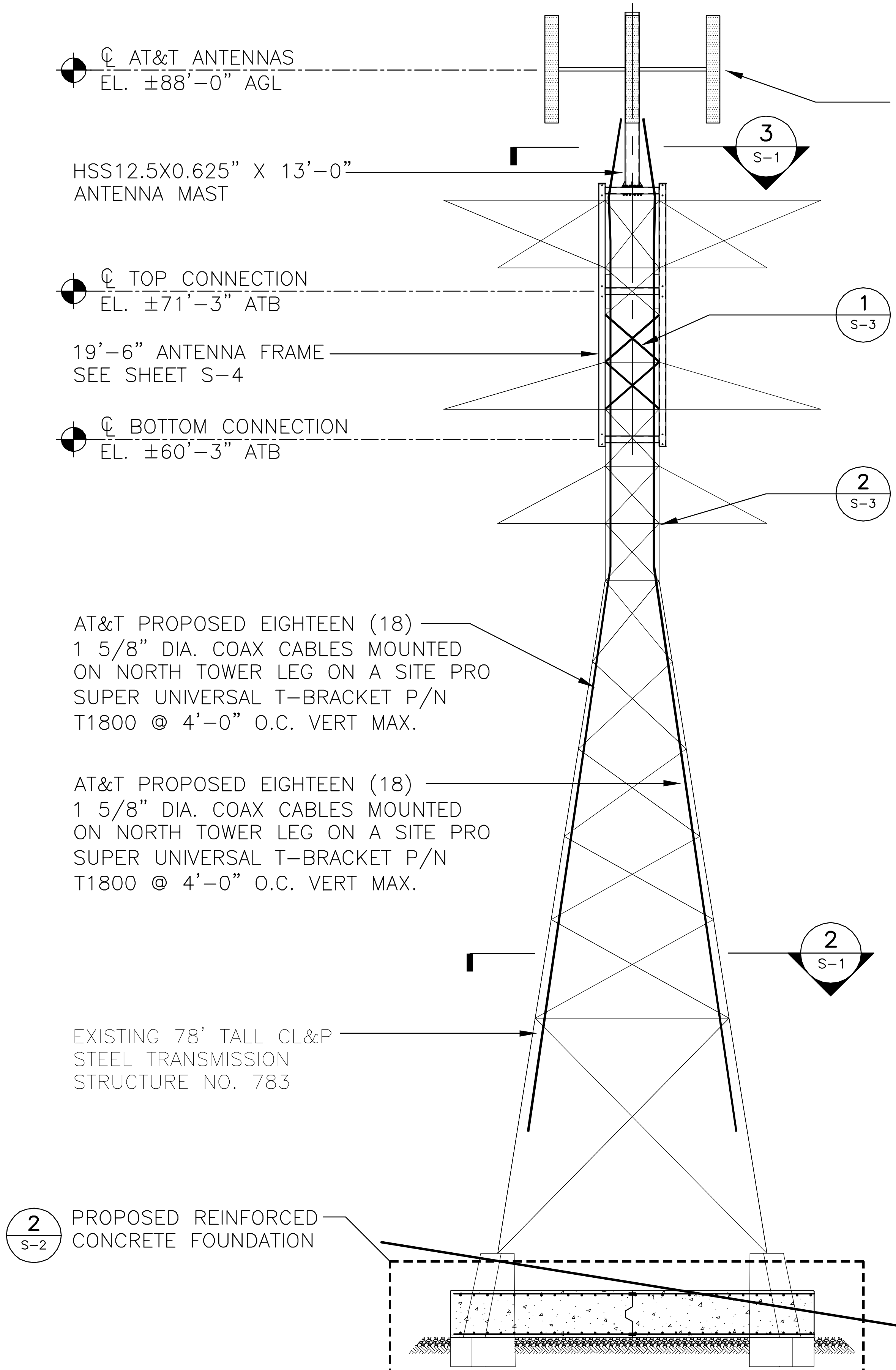
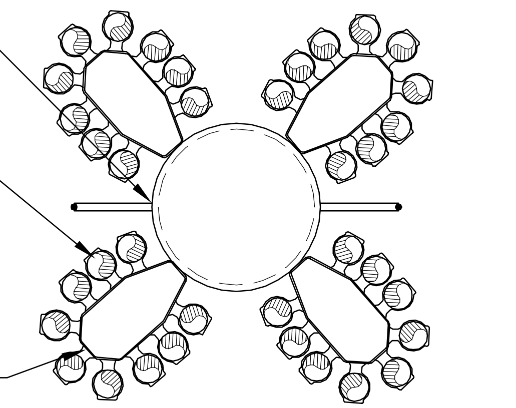
MODIFICATION INSPECTION REQUIREMENTS

SHEET NO.
MI–1
Sheet No. 6 of 11



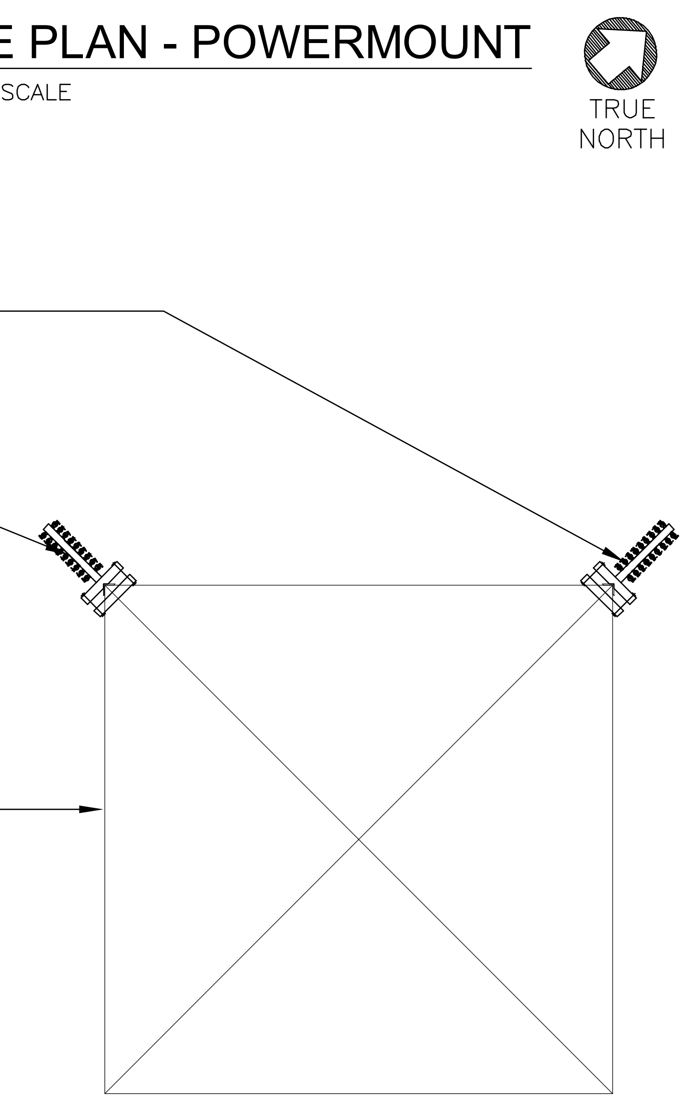
1 S-1 TOWER & MAST ELEVATION

SCALE: NOT TO SCALE



3 S-1 FEEDLINE PLAN - POWERMOUNT

SCALE: NOT TO SCALE



2 S-1 FEEDLINE PLAN - TOWER

SCALE: NOT TO SCALE

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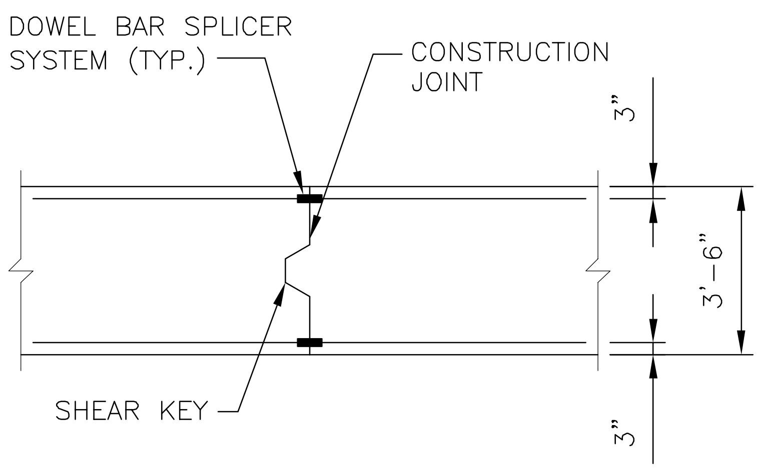
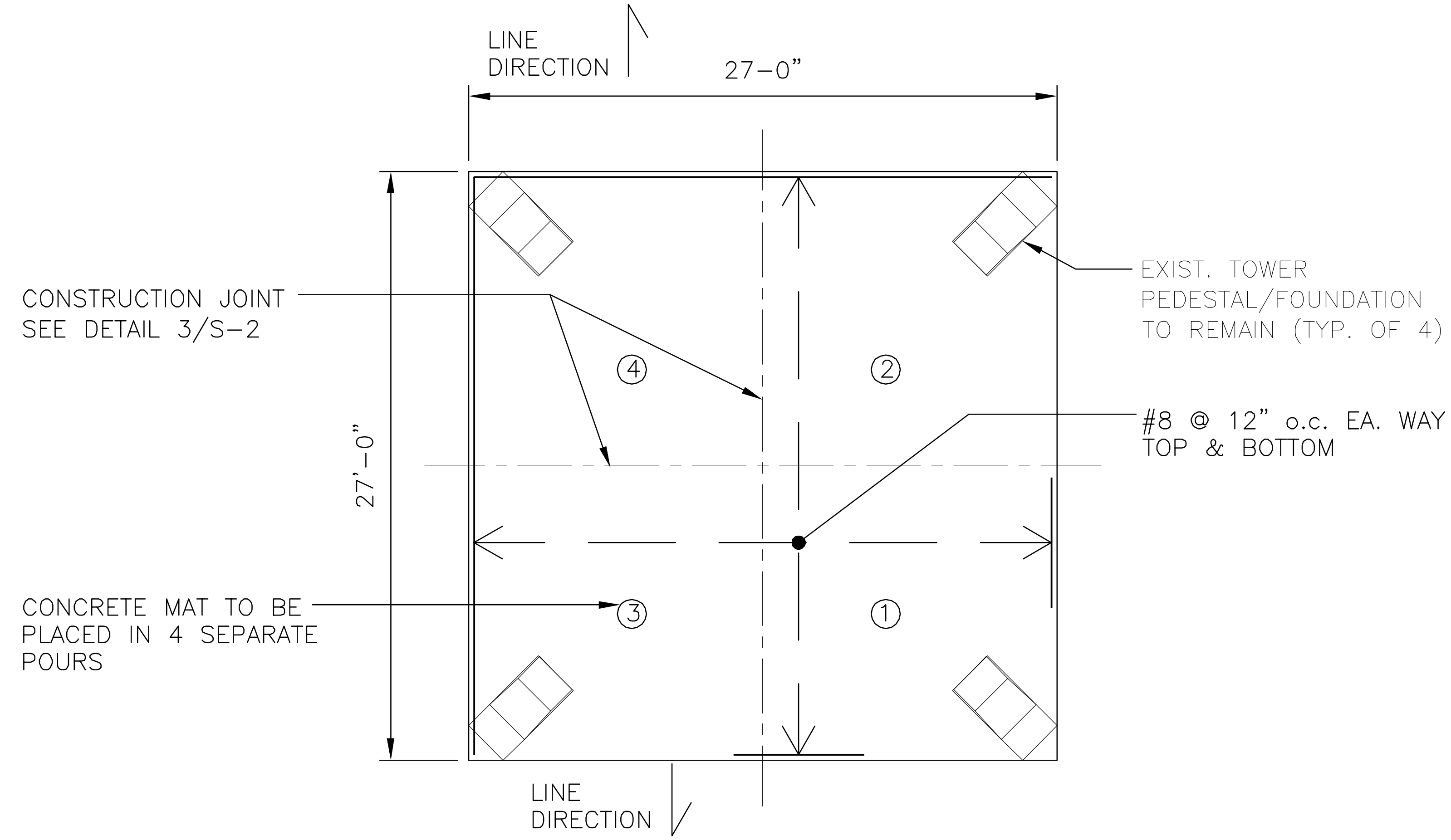
TOWER ELEVATION AND FEEDLINE PLAN

SHEET NO.
S-1
Sheet No. 7 of 11



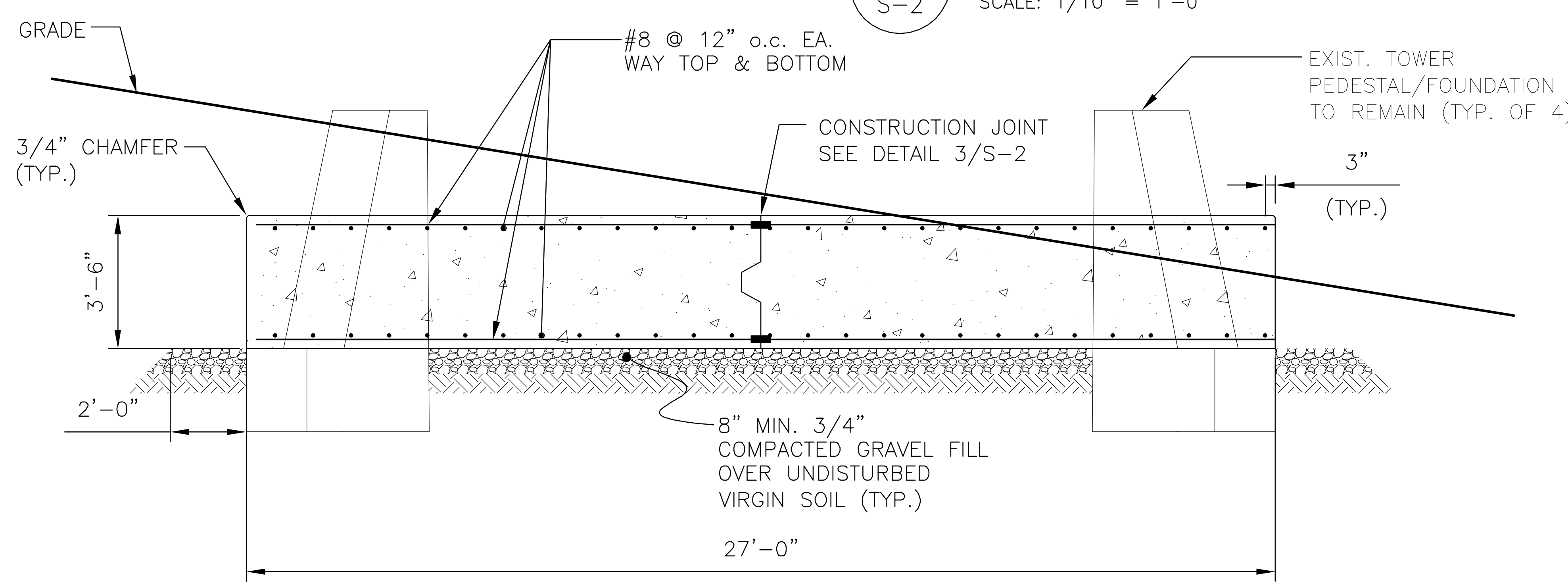
3 / S-2 CONSTRUCTION JOINT DETAIL

SCALE: 1/4" = 1'-0"



1 / S-2 FOUNDATION PLAN

SCALE: 1/10" = 1'-0"



2 / S-2 FOUNDATION SECTION

SCALE: 1/4" = 1'-0"

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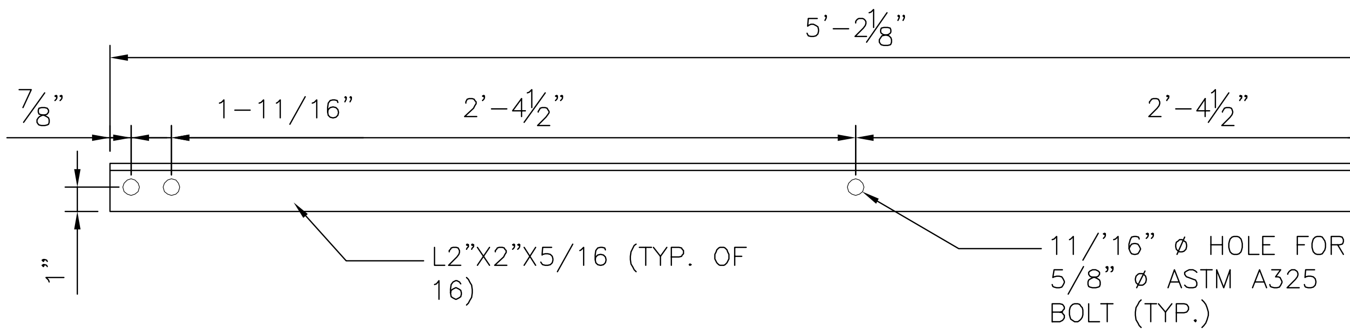
FOUNDATION REINFORCEMENT DETAILS

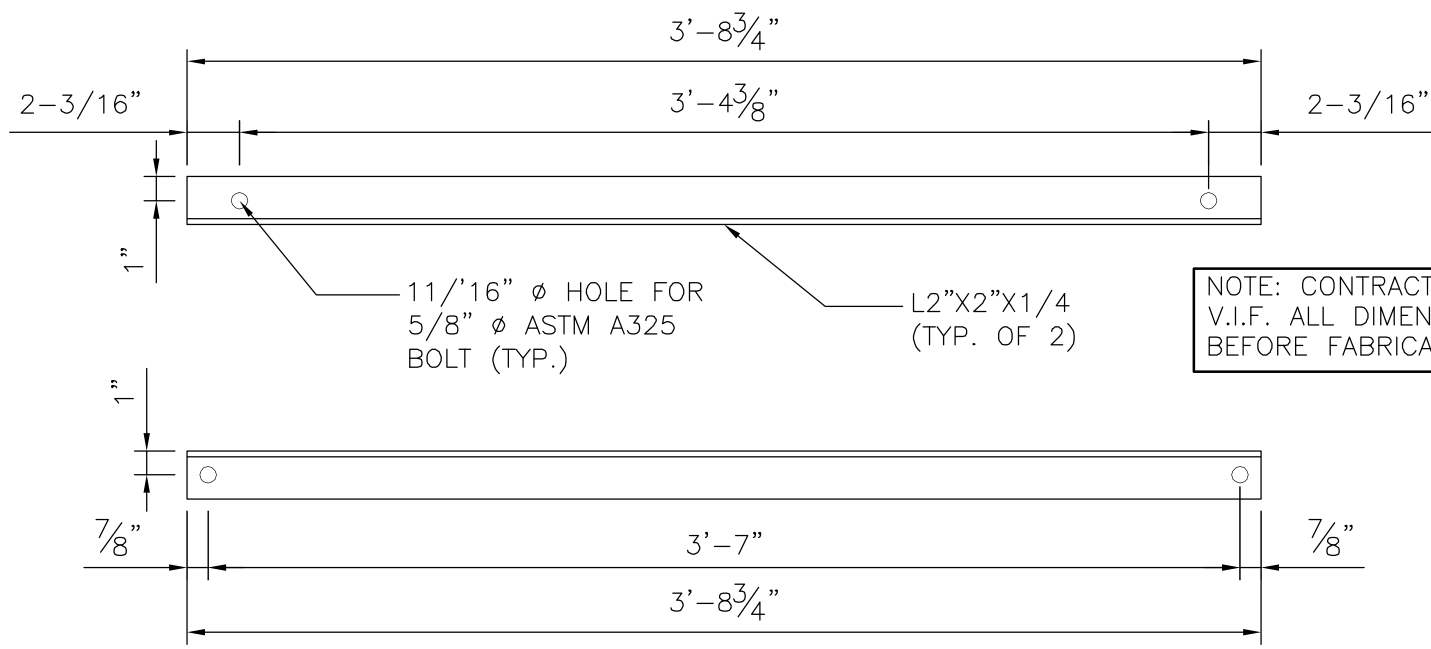
SHEET NO.
S-2
Sheet No. 8 of 11



NOTE: CONTRACTOR TO V.I.F. ALL DIMENSIONS BEFORE FABRICATION

1 / S-3 DIAGONAL REPLACEMENT MEMBER DETAILS

SCALE: 1-1/2" = 1'-0"



NOTE: CONTRACTOR TO V.I.F. ALL DIMENSIONS BEFORE FABRICATION

2 / S-3 HORIZONTAL REPLACEMENT MEMBER DETAILS

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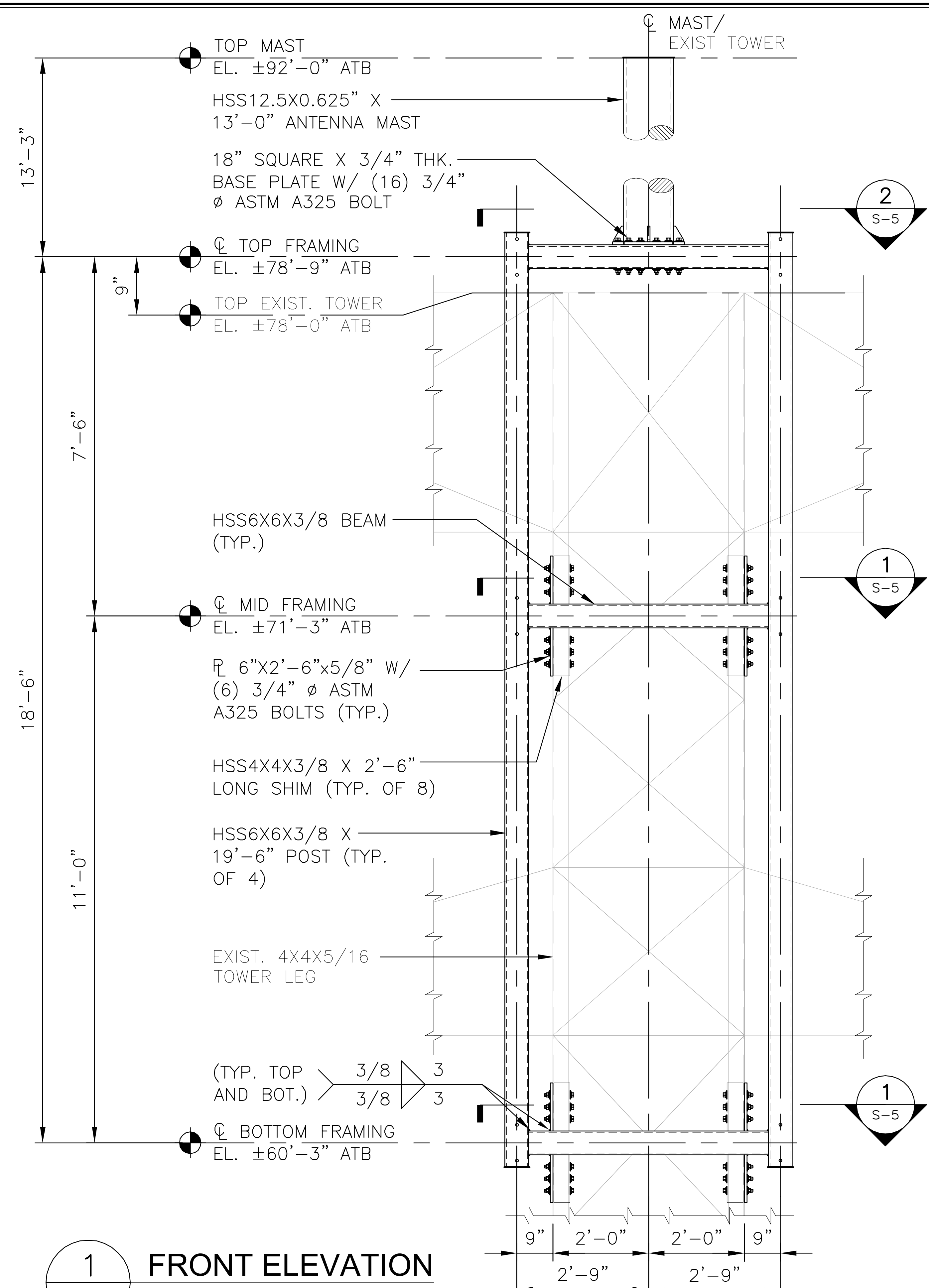
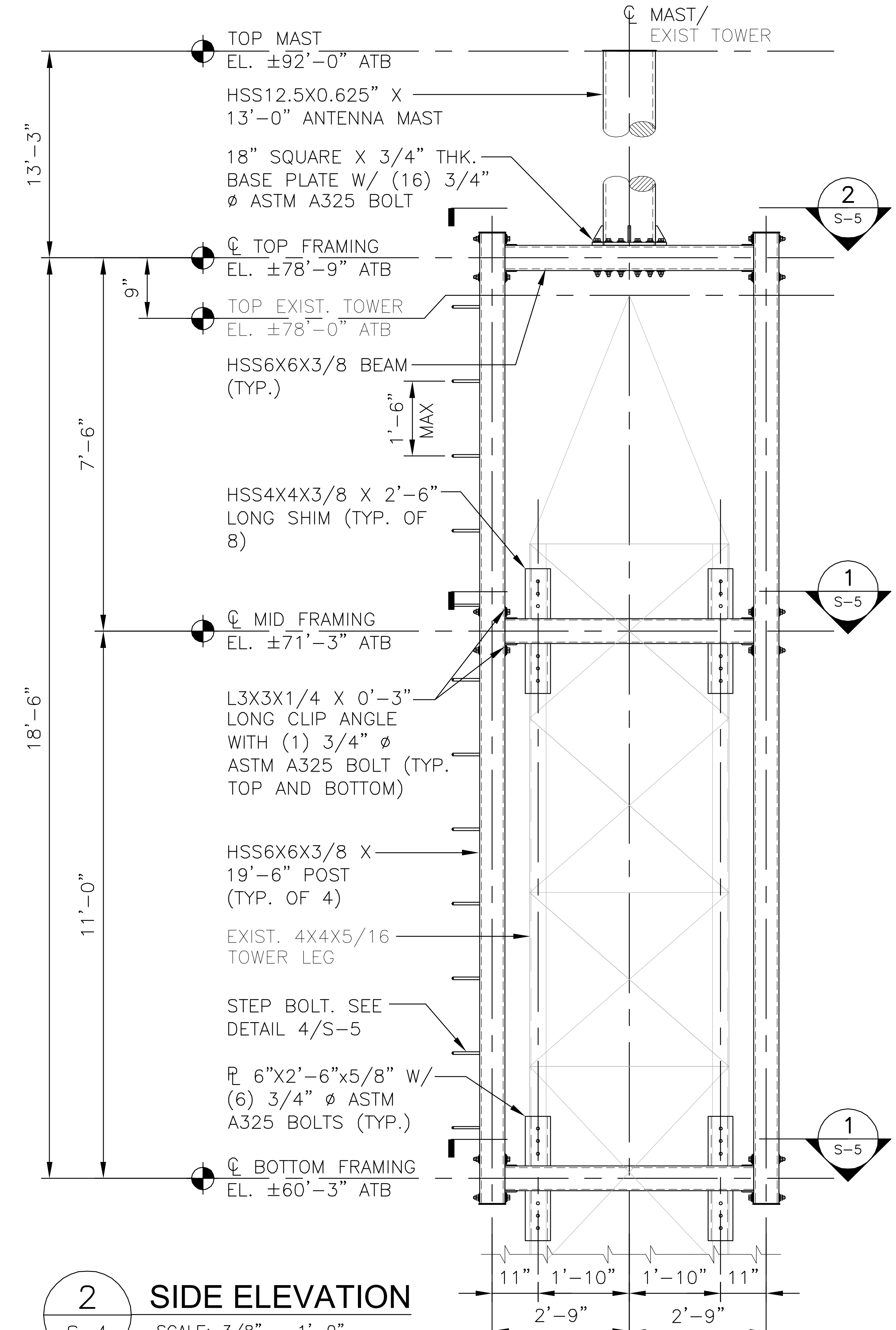
TOWER REINFORCEMENT DETAILS

SHEET NO.
S-3
Sheet No. 9 of 11



1 S-4 **FRONT ELEVATION**

SCALE: 3/8" = 1'-0"



2 S-4 **SIDE ELEVATION**

SCALE: 3/8" = 1'-0"

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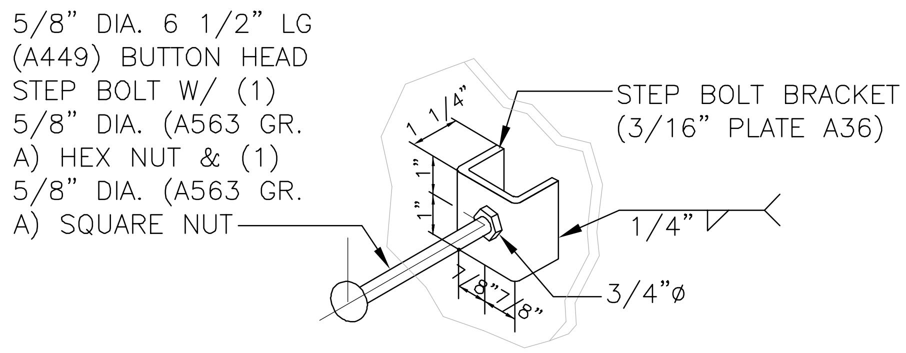
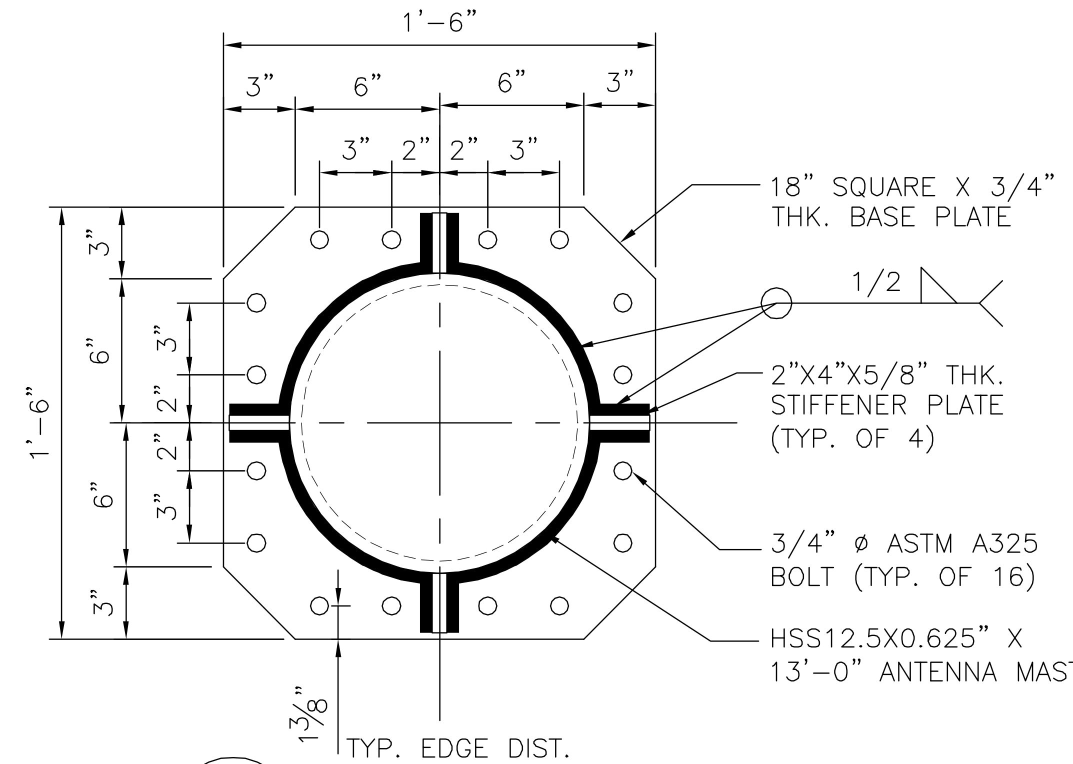
ANTENNA FRAME ELEVATIONS

SHEET NO.

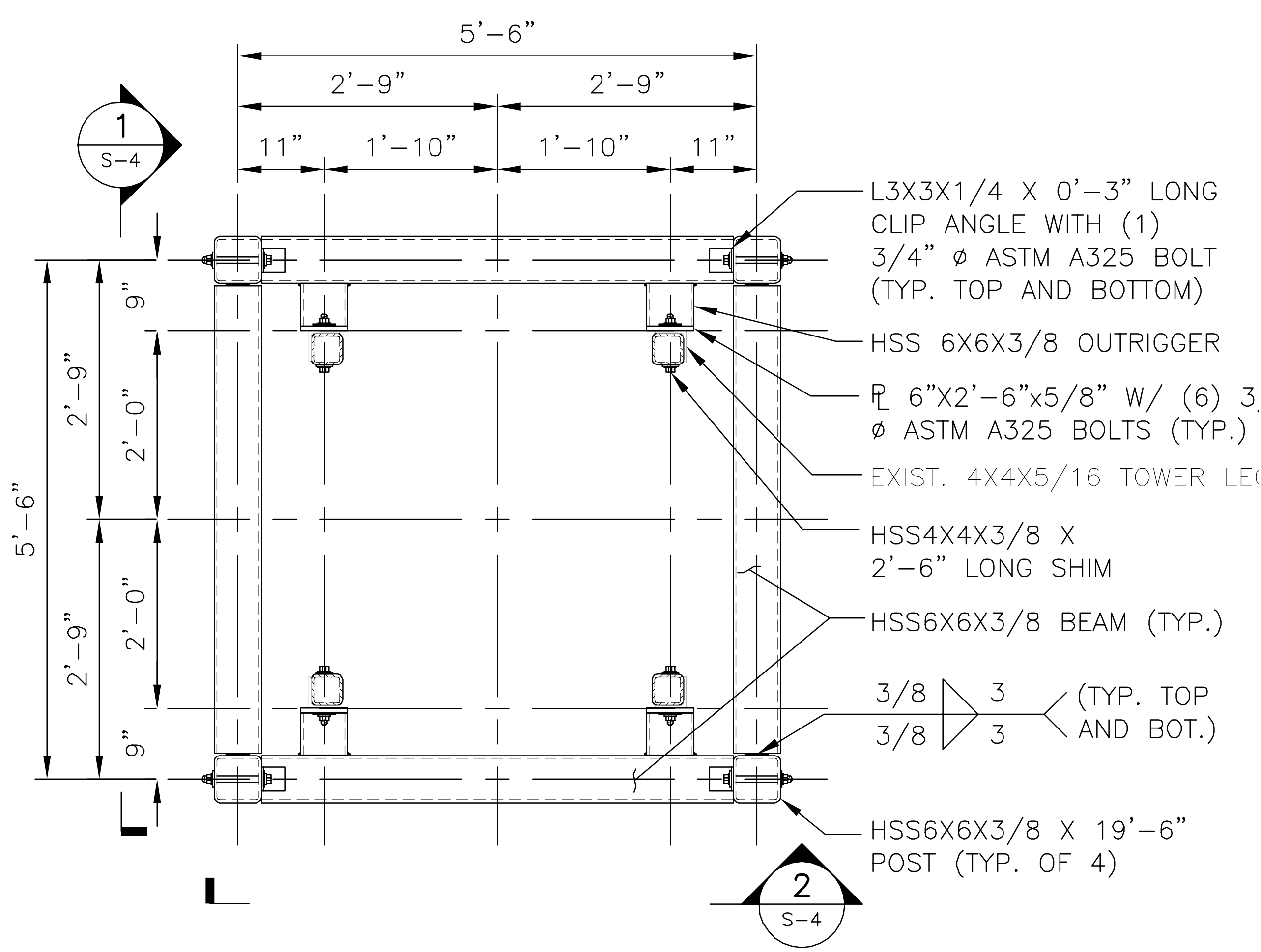
S-4



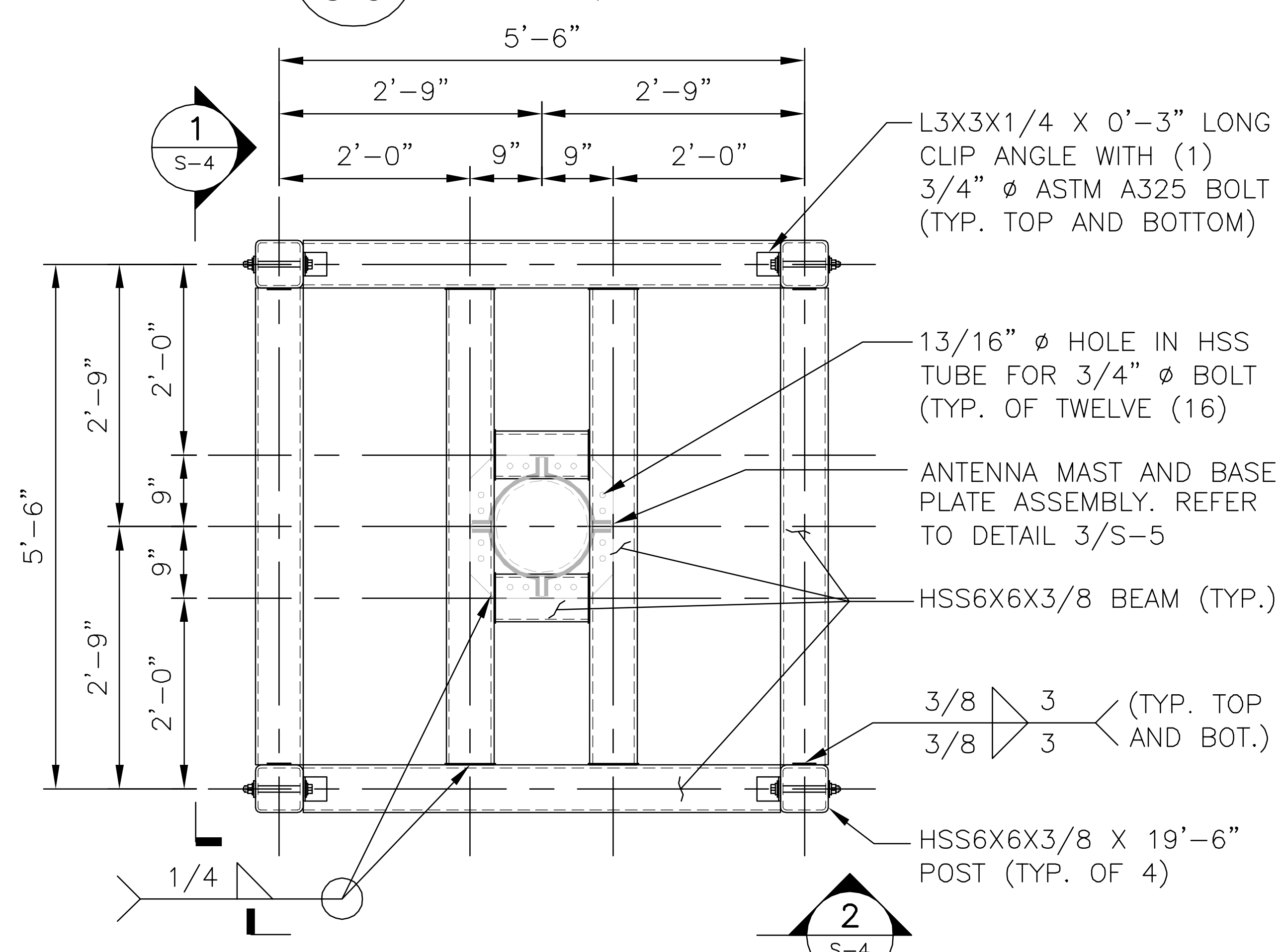
4
S-5
STEP BOLT DETAIL
SCALE: 3/4" = 1'-0"



3
S-5
BASE PLATE DETAIL
SCALE: 1-1/2" = 1'-0"



1
S-5
FRAMING PLAN BOTTOM & MIDDLE
SCALE: 1/2" = 1'-0"



2
S-5
FRAMING PLAN TOP
SCALE: 1/2" = 1'-0"

DESIGNED BY: TJL
DRAWN BY: TJL
CHK'D BY: CFC

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
4	10/6/14	TJL	CFC	REVISED FRAME
3	8/27/14	TJL	CFC	CONSTRUCTION
2	7/1/14	TJL	CFC	CONSTRUCTION
1	6/4/14	TJL	CFC	ISSUED FOR NU REVIEW
A	1/7/14	TJL	CFC	ISSUED FOR NU REVIEW

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AT&T MOBILITY
TOWER REINFORCEMENT DESIGN
CT2117
CL&P STRUCTURE 783
200 EDGEMARK ACRES
MERIDEN, CT 06451

DATE: 1/7/14
SCALE: AS SHOWN
JOB NO. 13305

ANTENNA FRAME PLAN & DETAILS

SHEET NO.
S-5
Sheet No. 11 of 11

Development of Design Heights, Exposure Coefficients, and Velocity Pressures Per TIA/EIA

Wind Speeds

Basic Wind Speed $V := 85$ mph (User Input per NU Mast Design Criteria Exception 1)

Basic Wind Speed with Ice $V_i := 74$ mph (User Input per TIA/EIA-222-F Section 2.3.16)

Heights above ground level, z

Mast $z_{mast} := 77.75$ ft (User Input)

AT&T $z_{att} := 88$ ft (User Input)

Mount $z_{mnt} := 88$ ft (User Input)

Coax $z_{coax} := 83$ ft (User Input)

Exposure Coefficients, kz (per TIA/EIA-222-F Section 2.3.3)

Mast $Kz_{mast} := \left(\frac{z_{mast}}{33}\right)^{\frac{2}{7}} = 1.277$

AT&T $Kz_{att} := \left(\frac{z_{att}}{33}\right)^{\frac{2}{7}} = 1.323$

Mount $Kz_{mnt} := \left(\frac{z_{mnt}}{33}\right)^{\frac{2}{7}} = 1.323$

Coax $Kz_{coax} := \left(\frac{z_{coax}}{33}\right)^{\frac{2}{7}} = 1.302$

Velocity Pressure without ice, qz (per TIA/EIA-222-F Section 2.3.3)

Mast $qz_{mast} := 0.00256 \cdot Kz_{mast} \cdot V^2 = 23.627$

AT&T $qz_{att} := 0.00256 \cdot Kz_{att} \cdot V^2 = 24.478$

Mount $qz_{mnt} := 0.00256 \cdot Kz_{mnt} \cdot V^2 = 24.478$

Coax $qz_{coax} := 0.00256 \cdot Kz_{coax} \cdot V^2 = 24.073$

Velocity Pressure with ice, qzICE (per TIA/EIA-222-F Section 2.3.3)

Mast $qzICE_{mast} := 0.00256 \cdot Kz_{mast} \cdot V_i^2 = 17.908$

AT&T $qzICE_{att} := 0.00256 \cdot Kz_{att} \cdot V_i^2 = 18.553$

Mount $qzICE_{mnt} := 0.00256 \cdot Kz_{mnt} \cdot V_i^2 = 18.553$

Coax $qzICE_{coax} := 0.00256 \cdot Kz_{coax} \cdot V_i^2 = 18.245$

TIA/EIA Common Factors:

Gust Response Factor = $G_H := 1.69$ (User Input per TIA/EIA-222-F Section 2.3.4)

Radial Ice Thickness = $Ir := 0.50$ in (User Input per TIA/EIA-222-F Section 2.3.1)

Radial Ice Density = $Id := 56.00$ pcf (User Input)

Development of Wind & Ice Load on PCS Mast

(per TIA/EIA-222-F-1996 Criteria)

Mast Data: (HSS12.5"x0.625") (User Input)

Mast Shape = Round (User Input)

Mast Diameter = $D_{mast} := 12.5$ in (User Input)

Mast Length = $L_{mast} := 13.5$ ft (User Input)

Mast Thickness = $t_{mast} := 0.625$ in (User Input)

Mast Aspect Ratio = $Ar_{mast} := \frac{12L_{mast}}{D_{mast}} = 13.0$

Mast Force Coefficient = $Ca_{mast} = 0.93$ (per TIA/EIA-222-F Table 3)

Wind Load (without ice)

(per TIA/EIA-222-F-1996 Section 2.3.2)

Mast Projected Surface Area = $A_{mast} := \frac{D_{mast}}{12} = 1.042$ sf/ft

Total Mast Wind Force = $qz_{mast} \cdot G_H \cdot Ca_{mast} \cdot A_{mast} = 39$ plf **BLC 5,7**

Wind Load (with ice)

(per TIA/EIA-222-F-1996 Section 2.3.2)

Mast Projected Surface Area w/ Ice = $AICE_{mast} := \frac{(D_{mast} + 2 \cdot Ir)}{12} = 1.125$ sf/ft

Total Mast Wind Force w/ Ice = $qzICE_{mast} \cdot G_H \cdot Ca_{mast} \cdot AICE_{mast} = 32$ plf **BLC 4,6**

Gravity Loads (without ice)

Weight of the mast = Self Weight **(Computed internally by Risa-3D)** plf **BLC 1**

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{mast} := \frac{\pi}{4}\left[\left(D_{mast} + Ir \cdot 2\right)^2 - D_{mast}^{\;2}\right] = 20.4$ sq in

Weight of Ice on Mast = $W_{ICEmast} := Id \cdot \frac{Ai_{mast}}{144} = 8$ plf **BLC 3**

Development of Wind & Ice Load on Antennas

(per TIA/EIA-222-F-1996 Criteria)

Antenna Data:

Antenna Model = CCI HPA-65R-BUU-H8

Antenna Shape = Flat (User Input)

Antenna Height = $L_{ant} := 92.4$ in (User Input)

Antenna Width = $W_{ant} := 14.8$ in (User Input)

Antenna Thickness = $T_{ant} := 7.4$ in (User Input)

Antenna Weight = $WT_{ant} := 78$ lbs (User Input)

Number of Antennas = $N_{ant} := 6$ (User Input)

Antenna Aspect Ratio = $Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 6.2$

Antenna Force Coefficient = $Ca_{ant} = 1.4$ (per TIA/EIA-222-F-1996 Table 3)

Wind Load (without ice)

(per TIA/EIA-222-F-1996 Section 2.3.2)

Assumes Maximum Possible Wind Pressure Applied to All Antennas Simultaneously

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 9.5$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 57$ sf

Total Antenna Wind Force = $F_{ant} := qz_{att} \cdot G_H \cdot Ca_{ant} \cdot A_{ant} = 3300$ lbs **BLC 5,7**

Wind Load (with ice)

(per TIA/EIA-222-F-1996 Section 2.3.2)

Assumes Maximum Possible Wind Pressure Applied to All Antennas Simultaneously

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 1) \cdot (W_{ant} + 1)}{144} = 10.2$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 61.5$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := qzICE_{att} \cdot G_H \cdot Ca_{ant} \cdot A_{ICEant} = 2699$ lbs **BLC 4,6**

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 468$ lbs **BLC 2**

Gravity Loads (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 1 \times 10^4$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 1)(W_{ant} + 1)(T_{ant} + 1) - V_{ant} = 2276$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 74$ lbs

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 443$ lbs **BLC 3**

Development of Wind & Ice Load on Antennas

(per TIA/EIA-222-F-1996 Criteria)

Antenna Data:

Antenna Model = CCI OPA-65R-LCUU-H8

Antenna Shape = Flat (User Input)

Antenna Height = $L_{ant} := 92.7$ in (User Input)

Antenna Width = $W_{ant} := 14.4$ in (User Input)

Antenna Thickness = $T_{ant} := 7.0$ in (User Input)

Antenna Weight = $WT_{ant} := 100$ lbs (User Input)

Number of Antennas = $N_{ant} := 3$ (User Input)

Antenna Aspect Ratio = $Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 6.4$

Antenna Force Coefficient = $Ca_{ant} = 1.4$ (per TIA/EIA-222-F-1996 Table 3)

Wind Load (without ice)

(per TIA/EIA-222-F-1996 Section 2.3.2)

Assumes Maximum Possible Wind Pressure Applied to All Antennas Simultaneously

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 9.3$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 27.8$ sf

Total Antenna Wind Force = $F_{ant} := qz_{att} \cdot G_H \cdot Ca_{ant} \cdot A_{ant} = 1611$ lbs **BLC 5,7**

Wind Load (with ice)

(per TIA/EIA-222-F-1996 Section 2.3.2)

Assumes Maximum Possible Wind Pressure Applied to All Antennas Simultaneously

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 1) \cdot (W_{ant} + 1)}{144} = 10$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 30.1$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := qzICE_{att} \cdot G_H \cdot Ca_{ant} \cdot A_{ICEant} = 1320$ lbs **BLC 4,6**

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 300$ lbs **BLC 2**

Gravity Loads (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 9344$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 1)(W_{ant} + 1)(T_{ant} + 1) - V_{ant} = 2200$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 71$ lbs

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 214$ lbs **BLC 3**

Development of Wind & Ice Load on TMAs (per TIA/EIA-222-F-1996 Criteria)

TMA Data:

TMA Model = CCI BPDB7823VG12A

TMA Shape = Flat (User Input)

TMA Height = $L_{tma} := 14.25$ in (User Input)

TMA Width = $W_{tma} := 11.03$ in (User Input)

TMA Thickness = $T_{tma} := 4.11$ in (User Input)

TMA Weight = $WT_{tma} := 30$ lbs (User Input)

Number of TMAs = $N_{tma} := 18$ (User Input)

TMA Aspect Ratio = $Ar_{tma} := \frac{L_{tma}}{W_{tma}} = 1.3$

TMA Force Coefficient = $Ca_{tma} = 1.4$ (per TIA/EIA-222-F-1996 Table 3)

Wind Load (without ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Assumes Maximum Possible Wind Pressure Applied to ALL TMAs Simultaneously

Surface Area for One TMA = $SA_{tma} := \frac{L_{tma} \cdot W_{tma}}{144} = 1.1$ sf

TMA Projected Surface Area = $A_{tma} := SA_{tma} \cdot N_{tma} = 19.6$ sf

Total TMA Wind Force = $F_{tma} := qz_{att} \cdot G_H \cdot Ca_{tma} \cdot A_{tma} = 1138$ lbs **BLC 5,7**

Wind Load (with ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Assumes Maximum Possible Wind Pressure Applied to ALL TMAs Simultaneously

Surface Area for One TMA w/ Ice = $SA_{ICEtma} := \frac{(L_{tma} + 1) \cdot (W_{tma} + 1)}{144} = 1.3$ sf

TMA Projected Surface Area w/ Ice = $A_{ICEtma} := SA_{ICEtma} \cdot N_{tma} = 22.9$ sf

Total TMA Wind Force w/ Ice = $Fi_{tma} := qzICE_{att} \cdot G_H \cdot Ca_{tma} \cdot A_{ICEtma} = 1007$ lbs **BLC 4,6**

Gravity Load (without ice)

Weight of All TMAs = $WT_{tma} \cdot N_{tma} = 540$ lbs **BLC 2**

Gravity Loads (ice only)

Volume of Each TMA = $V_{tma} := L_{tma} \cdot W_{tma} \cdot T_{tma} = 646$ cu in

Volume of Ice on Each TMA = $V_{ice} := (L_{tma} + 1)(W_{tma} + 1) \cdot (T_{tma} + 1) - V_{tma} = 291$ cu in

Weight of Ice on Each TMA = $W_{ICEtma} := \frac{V_{ice}}{1728} \cdot Id = 9$ lbs

Weight of Ice on All TMAs = $W_{ICEtma} \cdot N_{tma} = 170$ lbs **BLC 3**

Development of Wind & Ice Load on Antenna Mounts (per TIA/EIA-222-F-1996 Criteria)

Mount Data:

Mount Type: Site Pro Ultra Low Profile Monopole Mount ULP12

Mount Shape = Flat (User Input)

Mount Area = $CaA_{mnt} := 27$ sq ft (User Input)

Mount Area w/ Ice = $CaA_{ICEmnt} := 33.8$ sq ft (User Input)

Mount Weight = $WT_{mnt} := 1405$ lbs (User Input)

Mount Weight w/ Ice = $WT_{ICEmnt} := 1760$ lbs (User Input)

Wind Load (without ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Total Mount Wind Force = $F_{mnt} := qz_{mnt} \cdot G_H \cdot CaA_{mnt} = 1117$ lbs **BLC 5,7**

Wind Load (with ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Total Mount Wind Force = $Fi_{mnt} := qzICE_{mnt} \cdot G_H \cdot CaA_{ICEmnt} = 1060$ lbs **BLC 4,6**

Gravity Loads (without ice) (per TIA/EIA-222-F-1996)

Weight of All Mounts = $WT_{mnt} = 1405$ lbs **BLC 2**

Gravity Loads (ice only) (per TIA/EIA-222-F-1996)

Weight of Ice on All Mounts = $WT_{ICEmnt} - WT_{mnt} = 355$ lbs **BLC 3**

Development of Wind & Ice Load on Coax Cables per TIA/EIA-222-F-96 Criteria

Coax Cable Data:

Coax Type = HELIAX 1-5/8"

Shape = Round (User Input)

Coax Outside Diameter = $D_{coax} := 1.98$ in (User Input)

Coax Cable Length = $L_{coax} := 10$ ft (User Input)

Weight of Coax per foot = $Wt_{coax} := 1.04$ plf (User Input)

Total Number of Coax = $N_{coax} := 36$ (User Input)

No. of Coax Projecting Outside Face of PCS Mast = $NP_{coax} := 8$ (User Input)

Coax aspect ratio, $Ar_{coax} := \frac{(L_{coax} \cdot 12)}{D_{coax}} = 60.6$

Coax Cable Force Factor Coefficient = $Ca_{coax} = 1.2$ TIA/EIA-222-F-96 Table 3

Wind Load (without ice) per TIA/EIA-222-F-96 Section 2.3.2

Coax projected surface area = $A_{coax} := \frac{NP_{coax} \cdot D_{coax}}{12} = 1.3$ sf/ft

Total Coax Wind Force = $F_{coax} := qz_{coax} \cdot G_H \cdot Ca_{coax} \cdot A_{coax} = 64$ plf **BLC 5,7**

Wind Load (with ice) per TIA/EIA-222-F-96 Section 2.3.2

Coax projected surface area w/ Ice = $AICE_{coax} := \frac{NP_{coax} \cdot (D_{coax} + 2 \cdot Ir)}{12} = 2$ sf/ft

Total Coax Wind Force w/ Ice = $Fi_{coax} := qzICE_{coax} \cdot G_H \cdot Ca_{coax} \cdot AICE_{coax} = 74$ plf **BLC 4,6**

Gravity Loads (without ice)

Weight of all cables w/o ice $WT_{coax} := Wt_{coax} \cdot N_{coax} = 37$ plf **BLC 2**

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{coax} := \frac{\pi}{4}\left[(D_{coax} + 2 \cdot Ir)^2 - D_{coax}{}^2\right] = 3.9$ sq in

Ice Weight All Coax per foot = $WTi_{coax} := Id \cdot \left(N_{coax} \cdot \frac{Ai_{coax}}{144}\right) = 55$ plf **BLC 3**

Development of Wind & Ice Load on Brace Member (per TIA/EIA-222-F-1996 Criteria)

Member Data: HSS6x6x3/8

Antenna Shape = Flat (User Input)

Height = $H_{mem} := 6$ in (User Input)

Width = $W_{mem} := 6$ in (User Input)

Length = $L_{mem} := 84$ in (User Input)

Member Aspect Ratio = $Ar_{mem} := \frac{H_{mem}}{L_{mem}} = 0.1$

Member Force Coefficient = $Ca_{mem} = 1.4$ (per TIA/EIA-222-F-1996 Table 3)

Wind Load (without ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Member Projected Surface Area = $A_{mem} := \frac{H_{mem}}{12} = 0.5$ plf

Total Member Wind Force = $F_{mem} := qz_{mast} \cdot G_H \cdot Ca_{mem} \cdot A_{mem} = 28$ lbs **BLC 5,7**

Wind Load (with ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Member Projected Surface Area w/ Ice = $A_{ICEmem} := \frac{(H_{mem} + 2 \cdot Ir)}{12} = 0.58$ plf

Total Member Wind Force w/ Ice = $Fi_{mem} := qzICE_{mast} \cdot G_H \cdot Ca_{mem} \cdot A_{ICEmem} = 25$ lbs **BLC 4,6**

Gravity Load (without ice)

Weight of Member = Self Weight lbs **BLC 1**

Gravity Loads (ice only)

Ice Area per Linear foot = $Ai_{mem} := (W_{mem} + 2 \cdot Ir) \cdot (H_{mem} + 2 \cdot Ir) - W_{mem} \cdot H_{mem} = 13$ sq in

Weight of Ice on Member = $W_{ICE.mem} := Id \cdot \frac{Ai_{mem}}{144} = 5$ lbs **BLC 3**

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Subject: **Analysis of TIA/EIA Wind and Ice Loads for Design of Antenna Frame Only**
Tabulated Load Cases
Location: **Meriden, CT**
Date: 1/2/14 Prepared by: T.J.L. Checked by: C.F.C. Job No. 13305.000

Load Case	Description
1	Self Weight (Antenna Frame)
2	Weight of Appurtenances
3	Weight of Ice Only on Antenna Frame
4	x-direction TIA/EIA Wind with Ice on Antenna Frame
5	x-direction TIA/EIA Wind on Antenna Frame
6	z-direction TIA/EIA Wind with Ice on Antenna Frame
7	z-direction TIA/EIA Wind on Antenna Frame

Footnotes:

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Subject: **Analysis of TIA/EIA Wind and Ice Loads for Design of PCS Structure Only**
Load Combinations Table

Location: **Meriden, CT**

Date: 1/2/14 Prepared by: T.J.L. Checked by: C.F.C. Job No. 13305.000

Load Combination	Description	Envelope Soultion	Wind Factor	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	x-direction TIA/EIA Wind + Ice on PCS Structure		1		1	1	2	1	3	1	4	1		
2	x-direction TIA/EIA Wind on PCS Structure		1		1	1	2	1	5	1				
3	z-direction TIA/EIA Wind + Ice on PCS Structure		1		1	1	2	1	3	1	6	1		
4	z-direction TIA/EIA Wind on PCS Structure		1		1	1	2	1	7	1				

Footnotes:
(1) BLC = Basic Load Case
(2) PCS Structure includes: PCS Mast and Appurtenances

Global

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Increase Nailing Capacity for Wind?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automaticly Iterate Stiffness for Walls?	No
Maximum Iteration Number for Wall Stiffness	3
Gravity Acceleration (ft/sec^2)	32.2
Wall Mesh Size (in)	12
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 14th(360-10): ASD
Adjust Stiffness?	Yes(Iterative)
RISAConnection Code	AISC 14th(360-10): ASD
Cold Formed Steel Code	AISI 1999: ASD
Wood Code	AF&PA NDS-97: ASD
Wood Temperature	< 100F
Concrete Code	ACI 318-02
Masonry Code	ACI 530-05: ASD
Aluminum Code	AA ADM1-05: ASD - Building

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	PCA Load Contour
Parme Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections?	Yes
Use Cracked Sections Slab?	Yes
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR_SET_ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8

Global, Continued

Seismic Code	UBC 1997
Seismic Base Elevation (ft)	Not Entered
Add Base Weight?	No
Ct Z	.035
Ct X	.035
T Z (sec)	Not Entered
T X (sec)	Not Entered
R Z	8.5
R X	8.5
Ca	.36
Cv	.54
Nv	1
Occupancy Category	4
Seismic Zone	3
Seismic Detailing Code	ASCE 7-05
Om Z	1
Om X	1
Rho Z	1
Rho X	1

Footing Overturning Safety Factor	1.5
Check Concrete Bearing	No
Footing Concrete Weight (k/ft^3)	0
Footing Concrete f'c (ksi)	3
Footing Concrete Ec (ksi)	4000
Lamda	1
Footing Steel fy (ksi)	60
Minimum Steel	0.0018
Maximum Steel	0.0075
Footing Top Bar	#3
Footing Top Bar Cover (in)	3.5
Footing Bottom Bar	#3
Footing Bottom Bar Cover (in)	3.5
Pedestal Bar	#3
Pedestal Bar Cover (in)	1.5
Pedestal Ties	#3

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1...	Density[k/ft^3]	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
2	A572 Gr.50	29000	11154	.3	.65	.49	50	1.1	58	1.2
3	A992	29000	11154	.3	.65	.49	50	1.1	58	1.2
4	A500 Gr.42	29000	11154	.3	.65	.49	42	1.3	58	1.1
5	A500 Gr.46	29000	11154	.3	.65	.49	46	1.2	58	1.1
6	A53 Gr. B	29000	11154	.3	.65	.49	35	1.5	58	1.2

Hot Rolled Steel Design Parameters

	Label	Shape	Lengt...	Lbyy[ft]	Lbzz[ft]	Lcomp t...	Lcomp b...	L-torqu...	Kyy	Kzz	Cb	Function
1	M1	Mast	13.25	Segment	Segment							Lateral
2	M2	Brace	18.5									Lateral
3	M3	Brace	18.5									Lateral
4	M4	Brace	18.5									Lateral
5	M5	Brace	18.5									Lateral
6	M6	Brace	5.5									Lateral
7	M7	Brace	5.5									Lateral
8	M8	Brace	5.5									Lateral
9	M9	Brace	5.5									Lateral
10	M10	Brace	5.5									Lateral
11	M11	Brace	5.5									Lateral
12	M12	Brace	5.5									Lateral
13	M13	Brace	5.5									Lateral
14	M14	Brace	5.5	Segment	Segment							Lateral
15	M15	Brace	5.5									Lateral
16	M16	Brace	5.5	Segment	Segment							Lateral
17	M17	Brace	5.5									Lateral
18	M18	Brace	5.5	Segment	Segment							Lateral
19	M19	Brace	5.5	Segment	Segment							Lateral
20	M20	Brace	1.5									Lateral
21	M21	Brace	1.5									Lateral
22	M24	Brace	.75									Lateral
23	M25	Brace	.75									Lateral
24	M26	Brace	.75									Lateral
25	M27	Brace	.75									Lateral
26	M28	Brace	.75									Lateral
27	M29	Brace	.75									Lateral
28	M30	Brace	.75									Lateral
29	M31	Brace	.75									Lateral

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Ru...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Mast	HSS12.5X0.625	Beam	Pipe	A500 Gr.42	Typical	21.8	387	387	774
2	Brace	HSS6x6x6	Beam	Tube	A500 Gr.46	Typical	7.58	39.5	39.5	64.6

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design R...
1	M1	N1	N2			Mast	Beam	Pipe	A500 Gr.42	Typical
2	M2	N3	N11			Brace	Beam	Tube	A500 Gr.46	Typical
3	M3	N4	N12			Brace	Beam	Tube	A500 Gr.46	Typical
4	M4	N5	N13			Brace	Beam	Tube	A500 Gr.46	Typical
5	M5	N6	N14			Brace	Beam	Tube	A500 Gr.46	Typical
6	M6	N3	N4			Brace	Beam	Tube	A500 Gr.46	Typical
7	M7	N4	N6			Brace	Beam	Tube	A500 Gr.46	Typical
8	M8	N6	N5			Brace	Beam	Tube	A500 Gr.46	Typical
9	M9	N5	N3			Brace	Beam	Tube	A500 Gr.46	Typical
10	M10	N7	N8			Brace	Beam	Tube	A500 Gr.46	Typical
11	M11	N8	N10			Brace	Beam	Tube	A500 Gr.46	Typical
12	M12	N10	N9			Brace	Beam	Tube	A500 Gr.46	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design R...
13	M13	N9	N7			Brace	Beam	Tube	A500 Gr.46	Typical
14	M14	N11	N12			Brace	Beam	Tube	A500 Gr.46	Typical
15	M15	N12	N14			Brace	Beam	Tube	A500 Gr.46	Typical
16	M16	N14	N13			Brace	Beam	Tube	A500 Gr.46	Typical
17	M17	N13	N11			Brace	Beam	Tube	A500 Gr.46	Typical
18	M18	N18	N16			Brace	Beam	Tube	A500 Gr.46	Typical
19	M19	N15	N17			Brace	Beam	Tube	A500 Gr.46	Typical
20	M20	N20	N22			Brace	Beam	Tube	A500 Gr.46	Typical
21	M21	N19	N21			Brace	Beam	Tube	A500 Gr.46	Typical
22	M22	N20	N21			RIGID	None	None	RIGID	Typical
23	M23	N19	N22			RIGID	None	None	RIGID	Typical
24	M24	N23	N27			Brace	Beam	Tube	A500 Gr.46	Typical
25	M25	N24	N28			Brace	Beam	Tube	A500 Gr.46	Typical
26	M26	N25	N29			Brace	Beam	Tube	A500 Gr.46	Typical
27	M27	N26	N30			Brace	Beam	Tube	A500 Gr.46	Typical
28	M28	N31	N35			Brace	Beam	Tube	A500 Gr.46	Typical
29	M29	N32	N36			Brace	Beam	Tube	A500 Gr.46	Typical
30	M30	N33	N37			Brace	Beam	Tube	A500 Gr.46	Typical
31	M31	N34	N38			Brace	Beam	Tube	A500 Gr.46	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
1	N1	0	18.5	0	0	
2	N2	0	31.75	0	0	
3	N3	2.75	0	2.75	0	
4	N4	2.75	0	-2.75	0	
5	N5	-2.75	0	2.75	0	
6	N6	-2.75	0	-2.75	0	
7	N7	2.75	11	2.75	0	
8	N8	2.75	11	-2.75	0	
9	N9	-2.75	11	2.75	0	
10	N10	-2.75	11	-2.75	0	
11	N11	2.75	18.5	2.75	0	
12	N12	2.75	18.5	-2.75	0	
13	N13	-2.75	18.5	2.75	0	
14	N14	-2.75	18.5	-2.75	0	
15	N15	2.75	18.5	.75	0	
16	N16	2.75	18.5	-.75	0	
17	N17	-2.75	18.5	.75	0	
18	N18	-2.75	18.5	-.75	0	
19	N19	.75	18.5	.75	0	
20	N20	-.75	18.5	.75	0	
21	N21	.75	18.5	-.75	0	
22	N22	-.75	18.5	-.75	0	
23	N23	2.75	0	1.833	0	
24	N24	2.75	0	-1.833	0	
25	N25	-2.75	0	1.833	0	
26	N26	-2.75	0	-1.833	0	
27	N27	2	0	1.833	0	
28	N28	2	0	-1.833	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
29	N29	-2	0	1.833	0	
30	N30	-2	0	-1.833	0	
31	N31	2.75	11	1.833	0	
32	N32	2.75	11	-1.833	0	
33	N33	-2.75	11	1.833	0	
34	N34	-2.75	11	-1.833	0	
35	N35	2	11	1.833	0	
36	N36	2	11	-1.833	0	
37	N37	-2	11	1.833	0	
38	N38	-2	11	-1.833	0	

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]	Footing
1	N3							
2	N4							
3	N5							
4	N6							
5	N7							
6	N8							
7	N9							
8	N10							
9	N31							
10	N32							
11	N33							
12	N34							
13	N35	Reaction	Reaction	Reaction				
14	N36	Reaction	Reaction	Reaction				
15	N37	Reaction	Reaction	Reaction				
16	N38	Reaction	Reaction	Reaction				
17	N23							
18	N24							
19	N25							
20	N26							
21	N27	Reaction	Reaction	Reaction				
22	N28	Reaction	Reaction	Reaction				
23	N29	Reaction	Reaction	Reaction				
24	N30	Reaction	Reaction	Reaction				

Member Point Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Y	-.468	9.25
2	M1	Y	-.3	9.25
3	M1	Y	-.54	9.25
4	M1	Y	-1.405	9.25

Member Point Loads (BLC 3 : Weight of Ice Only on Antenna Fr)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Y	-.443	9.25

Member Point Loads (BLC 3 : Weight of Ice Only on Antenna Fr) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
2	M1	Y	-.214	9.25
3	M1	Y	-.17	9.25
4	M1	Y	-.355	9.25

Member Point Loads (BLC 4 : x-dir TIA/EIA Wind with Ice on A)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	2.699	9.25
2	M1	X	1.32	9.25
3	M1	X	1.007	9.25
4	M1	X	1.06	9.25

Member Point Loads (BLC 5 : x-dir TIA/EIA Wind on Antenna Fr)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	3.3	9.25
2	M1	X	1.611	9.25
3	M1	X	1.138	9.25
4	M1	X	1.117	9.25

Member Point Loads (BLC 6 : z-dir TIA/EIA Wind with Ice on A)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Z	2.699	9.25
2	M1	Z	1.32	9.25
3	M1	Z	1.007	9.25
4	M1	Z	1.06	9.25

Member Point Loads (BLC 7 : z-dir TIA/EIA Wind on Antenna Fr)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Z	3.3	9.25
2	M1	Z	1.611	9.25
3	M1	Z	1.138	9.25
4	M1	Z	1.117	9.25

Joint Loads and Enforced Displacements

Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/f...
No Data to Print ...			

Member Distributed Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Start Magnitude[k/ft,F]	End Magnitude[k/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.037	-.037	0	0
2	M4	Y	-.019	-.019	11	18
3	M2	Y	-.019	-.019	11	18

Member Distributed Loads (BLC 3 : Weight of Ice Only on Antenna Fr)

	Member Label	Direction	Start Magnitude[k/ft,F]	End Magnitude[k/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.008	-.008	0	0
2	M1	Y	-.055	-.055	0	0

Member Distributed Loads (BLC 3 : Weight of Ice Only on Antenna Fr) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,F]	End Magnitude[k/ft,F]	Start Location[ft,%]	End Location[ft,%]
3	M4	Y	-.028	-.028	11	18
4	M2	Y	-.028	-.028	11	18
5	M16	Y	-.005	-.005	0	0
6	M15	Y	-.005	-.005	0	0
7	M18	Y	-.005	-.005	0	0
8	M19	Y	-.005	-.005	0	0
9	M20	Y	-.005	-.005	0	0
10	M21	Y	-.005	-.005	0	0
11	M14	Y	-.005	-.005	0	0
12	M17	Y	-.005	-.005	0	0
13	M4	Y	-.005	-.005	0	0
14	M5	Y	-.005	-.005	0	0
15	M3	Y	-.005	-.005	0	0
16	M2	Y	-.005	-.005	0	0
17	M13	Y	-.005	-.005	0	0
18	M12	Y	-.005	-.005	0	0
19	M11	Y	-.005	-.005	0	0
20	M10	Y	-.005	-.005	0	0
21	M7	Y	-.005	-.005	0	0
22	M6	Y	-.005	-.005	0	0
23	M9	Y	-.005	-.005	0	0
24	M8	Y	-.005	-.005	0	0

Member Distributed Loads (BLC 4 : x-dir TIA/EIA Wind with Ice on A)

	Member Label	Direction	Start Magnitude[k/ft,F]	End Magnitude[k/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.032	.032	0	0
2	M1	X	.074	.074	0	0
3	M4	X	.037	.037	11	18
4	M2	X	.037	.037	11	18
5	M5	X	.025	.025	0	0
6	M4	X	.025	.025	0	0
7	M16	X	.025	.025	0	0
8	M12	X	.025	.025	0	0
9	M8	X	.025	.025	0	0

Member Distributed Loads (BLC 5 : x-dir TIA/EIA Wind on Antenna Fr)

	Member Label	Direction	Start Magnitude[k/ft,F]	End Magnitude[k/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.039	.039	0	0
2	M1	X	.064	.064	0	0
3	M4	X	.032	.032	11	18
4	M2	X	.032	.032	11	18
5	M5	X	.028	.028	0	0
6	M4	X	.028	.028	0	0
7	M16	X	.028	.028	0	0
8	M12	X	.028	.028	0	0
9	M8	X	.028	.028	0	0

Member Distributed Loads (BLC 6 : z-dir TIA/EIA Wind with Ice on A)

	Member Label	Direction	Start Magnitude[k/ft,F]	End Magnitude[k/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M1	Z	.032	.032	0	0

Member Distributed Loads (BLC 6 : z-dir TIA/EIA Wind with Ice on A) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,F]	End Magnitude[k/ft,F]	Start Location[ft,%]	End Location[ft,%]
2	M1	Z	.074	.074	0	0
3	M4	Z	.074	.074	11	18
4	M2	Z	.074	.074	11	18
5	M5	Z	.025	.025	0	0
6	M3	Z	.025	.025	0	0
7	M15	Z	.025	.025	0	0
8	M11	Z	.025	.025	0	0
9	M7	Z	.025	.025	0	0

Member Distributed Loads (BLC 7 : z-dir TIA/EIA Wind on Antenna Fr)

	Member Label	Direction	Start Magnitude[k/ft,F]	End Magnitude[k/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M1	Z	.039	.039	0	0
2	M1	Z	.064	.064	0	0
3	M4	Z	.064	.064	11	18
4	M2	Z	.064	.064	11	18
5	M5	Z	.028	.028	0	0
6	M3	Z	.028	.028	0	0
7	M15	Z	.028	.028	0	0
8	M11	Z	.028	.028	0	0
9	M7	Z	.028	.028	0	0

Basic Load Cases

	BLC Description	Category	X Gra...	Y Gra...	Z Grav...	Joint	Point	Distrib...	Area(...	Surfac...
1	Self Weight (Antenna Frame)	None		-1						
2	Weight of Appurtenances	None					4	3		
3	Weight of Ice Only on Antenna Fr	None					4	24		
4	x-dir TIA/EIA Wind with Ice on A	None					4	9		
5	x-dir TIA/EIA Wind on Antenna Fr	None					4	9		
6	z-dir TIA/EIA Wind with Ice on A	None					4	9		
7	z-dir TIA/EIA Wind on Antenna Fr	None					4	9		

Load Combinations

	Description	Solve	PDelta	SRSS	B...	Fa...	BLC	Fa...	BLC	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	x-dir TIA/EIA Wind + Ice on An...	Yes	Y		1	1	2	1	3	1	4	1								
2	x-dir TIA/EIA Wind on Antenna...	Yes	Y		1	1	2	1	5	1										
3	z-dir TIA/EIA Wind + Ice on An...	Yes	Y		1	1	2	1	3	1	6	1								
4	z-dir TIA/EIA Wind on Antenna...	Yes	Y		1	1	2	1	7	1										
5	Self Weight		Y																	

Envelope Member Section Forces

	Member	Sec		Axial[k]	LC	y Shear...	LC	z Shear...	LC	Torque[...	LC	y-y Mo...	LC	z-z Mo...	LC
1	M1	1	max	6.203	1	8.562	2	0	2	0	1	75.78	4	75.738	2
2			min	4.186	2	0	3	-8.565	4	0	1	0	2	0	3
3		2	max	5.626	1	8.221	2	0	2	0	1	47.973	4	47.942	2
4			min	3.818	2	0	3	-8.224	4	0	1	0	2	0	3
5		3	max	5.049	1	7.879	2	0	2	0	1	21.297	4	21.277	2
6			min	3.45	2	0	3	-7.883	4	0	1	0	2	0	3

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[k]	LC	y Shear...	LC	z Shear...	LC	Torque[...	LC	y-y Mo...	LC	z-z Mo...	LC
7		4	max	.577	1	.391	1	0	2	0	1	.728	3	.715	1
8			min	.368	2	0	3	-.395	3	0	1	0	2	0	3
9		5	max	0	1	.04	1	0	2	0	1	0	1	0	1
10			min	0	1	0	3	-.044	3	0	1	0	1	0	1
11	M2	1	max	7.622	2	-.269	4	1.607	4	0	4	.002	1	-1.5	4
12			min	4.091	3	-1.211	2	-.003	1	-.009	1	0	4	-5.989	2
13		2	max	7.503	2	-.269	4	1.607	4	0	4	7.432	4	-.257	4
14			min	3.948	3	-1.211	2	-.003	1	-.009	1	-.01	1	-.388	2
15		3	max	7.383	2	-.269	4	1.607	4	0	4	14.864	4	5.212	2
16			min	3.806	3	-1.211	2	-.003	1	-.009	1	-.022	1	.986	4
17		4	max	11.298	2	2.327	2	.013	1	0	4	10.478	4	2.118	2
18			min	8.179	3	.042	3	-2.412	4	-.045	1	-.019	1	-.72	3
19		5	max	11.1	2	2.195	2	.013	1	0	4	.042	1	-.914	3
20			min	7.843	3	.042	3	-2.148	4	-.045	1	0	4	-8.305	2
21	M3	1	max	7.504	2	.129	4	1.466	4	0	2	.012	1	.703	4
22			min	-2.41	4	-1.196	2	-.005	1	0	1	0	4	-5.925	2
23		2	max	7.385	2	.129	4	1.596	4	0	2	7.081	4	.108	4
24			min	-2.53	4	-1.196	2	-.005	1	0	1	-.012	1	-.392	2
25		3	max	7.265	2	.129	4	1.725	4	0	2	14.762	4	5.141	2
26			min	-2.649	4	-1.196	2	-.005	1	0	1	-.035	1	-.487	4
27		4	max	11.222	2	2.254	2	.018	1	0	4	10.805	4	2.165	2
28			min	-5.49	4	-.047	4	-2.401	4	-.056	1	-.027	1	.236	3
29		5	max	11.102	2	2.254	2	.018	1	0	4	.054	1	.583	4
30			min	-5.609	4	-.047	4	-2.272	4	-.056	1	0	4	-8.259	2
31	M4	1	max	4.109	4	.274	3	1.607	4	0	4	0	4	1.533	3
32			min	-5.808	2	-.926	2	.001	2	-.009	1	-.002	1	-4.998	2
33		2	max	3.989	4	.274	3	1.607	4	0	4	7.432	4	.266	3
34			min	-5.927	2	-1.055	2	.001	2	-.009	1	.005	2	-.417	2
35		3	max	3.87	4	.274	3	1.607	4	0	4	14.864	4	4.762	2
36			min	-6.046	2	-1.185	2	.001	2	-.009	1	.011	2	-1.001	3
37		4	max	8.364	4	2.373	2	-.01	2	0	4	10.478	4	2.431	2
38			min	-8.345	2	-.048	4	-2.412	4	-.045	1	.011	2	.713	4
39		5	max	8.166	4	2.111	2	-.01	2	0	4	0	4	.934	4
40			min	-8.543	2	-.048	4	-2.148	4	-.045	1	-.042	1	-7.904	2
41	M5	1	max	-1.7	3	-.079	3	1.466	4	0	2	0	4	-.424	3
42			min	-5.812	2	-.918	2	.004	2	0	1	-.012	1	-4.974	2
43		2	max	-1.842	3	-.079	3	1.596	4	0	2	7.081	4	-.059	3
44			min	-5.931	2	-1.048	2	.004	2	0	1	.008	2	-.428	2
45		3	max	-1.985	3	-.079	3	1.725	4	0	2	14.762	4	4.716	2
46			min	-6.051	2	-1.177	2	.004	2	0	1	.027	2	.305	3
47		4	max	-4.045	3	2.295	2	-.015	2	0	4	10.805	4	2.464	2
48			min	-8.426	2	.037	3	-2.401	4	-.056	1	.02	2	-.368	4
49		5	max	-4.187	3	2.165	2	-.015	2	0	4	0	4	-.404	3
50			min	-8.545	2	.037	3	-2.272	4	-.056	1	-.054	1	-7.849	2
51	M6	1	max	1.607	4	-4.178	3	-.621	3	-2.605	4	0	1	0	1
52			min	0	1	-7.462	2	-1.083	2	-5.649	2	0	1	0	1
53		2	max	.093	4	1.667	4	.004	1	1.814	4	.379	4	6.822	2
54			min	-1.007	2	.063	2	-.275	4	.032	2	-.235	2	3.08	4
55		3	max	.093	4	1.631	4	.004	1	1.814	4	0	4	6.759	2
56			min	-1.007	2	.028	2	-.275	4	.032	2	-.23	2	.813	4
57		4	max	.093	4	1.596	4	.004	1	1.814	4	-.198	1	6.745	2
58			min	-1.007	2	-.008	2	-.275	4	.032	2	-.378	4	-1.405	4

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[k]	LC	y Shear...	LC	z Shear...	LC	Torque[...	LC	y-y Mo...	LC	z-z Mo...	LC
59		5	max	.005	2	7.351	2	1.072	2	5.589	2	0	1	0	1
60			min	-1.389	4	-2.338	4	-.662	4	-1.103	4	0	1	0	1
61	M7	1	max	.533	4	.085	3	.077	4	0	4	0	1	-.143	1
62			min	.125	2	-.154	2	0	1	-.012	1	0	2	-.399	4
63		2	max	.533	4	.042	3	.039	4	0	4	.079	4	.042	1
64			min	.125	2	-.189	2	0	1	-.012	1	0	2	-.472	4
65		3	max	.533	4	0	4	0	2	0	4	.106	4	.285	1
66			min	.125	2	-.225	2	0	1	-.012	1	0	1	-.497	4
67		4	max	.533	4	-.035	4	0	2	0	4	.079	4	.587	1
68			min	.125	2	-.26	2	-.038	4	-.012	1	0	1	-.472	4
69		5	max	.533	4	-.071	4	0	2	0	4	0	2	.946	1
70			min	.125	2	-.296	2	-.077	4	-.012	1	0	1	-.399	4
71	M8	1	max	-.004	1	5.517	2	1.043	2	4.074	2	0	1	0	1
72			min	-1.389	4	1.614	3	.591	3	.615	3	0	1	0	1
73		2	max	1	2	.033	2	.275	4	-.002	2	.213	2	-.827	3
74			min	.082	3	-1.596	4	.038	1	-1.814	4	-.378	4	-5.066	2
75		3	max	1	2	-.003	2	.275	4	-.002	2	.244	2	1.137	3
76			min	.082	3	-1.631	4	.003	2	-1.814	4	0	3	-5.086	2
77		4	max	1	2	-.038	2	.275	4	-.002	2	.379	4	3.158	3
78			min	.082	3	-1.667	4	-.035	2	-1.814	4	.196	1	-5.058	2
79		5	max	1.607	4	4.183	4	.688	4	2.678	3	0	1	0	1
80			min	-.002	2	-5.506	2	-1.054	2	-4.066	2	0	1	0	1
81	M9	1	max	.149	1	.302	2	0	4	0	4	.009	1	1.145	3
82			min	-.419	4	.071	4	-.003	1	-.002	1	0	4	.932	2
83		2	max	.149	1	.267	2	0	4	0	4	.005	1	1.058	3
84			min	-.419	4	.035	4	-.003	1	-.002	1	0	4	.541	2
85		3	max	.149	1	.231	2	0	4	0	4	0	1	1.029	3
86			min	-.419	4	0	4	-.003	1	-.002	1	0	1	.199	2
87		4	max	.149	1	.196	2	0	4	0	4	0	4	1.058	3
88			min	-.419	4	-.042	3	-.003	1	-.002	1	-.005	1	-.095	2
89		5	max	.149	1	.16	2	0	4	0	4	0	4	1.145	3
90			min	-.419	4	-.085	3	-.003	1	-.002	1	-.009	1	-.34	2
91	M10	1	max	.028	1	-4.727	3	3.679	2	-3.048	4	0	1	0	1
92			min	-3.975	4	-6.366	2	1.696	3	-4.781	2	0	1	0	1
93		2	max	3.359	2	1.883	4	.789	4	1.95	4	.845	2	5.821	2
94			min	.164	3	.054	2	-.066	1	.051	2	-1.079	4	3.483	4
95		3	max	3.359	2	1.847	4	.789	4	1.95	4	.767	2	5.771	2
96			min	.164	3	.019	2	-.066	1	.051	2	.005	3	.919	4
97		4	max	3.359	2	1.812	4	.789	4	1.95	4	1.09	4	5.77	2
98			min	.164	3	-.017	2	-.066	1	.051	2	.592	1	-1.597	4
99		5	max	4.483	4	6.291	2	1.891	4	4.8	2	0	1	0	1
100			min	-.042	1	-2.656	4	-3.502	2	-1.364	4	0	1	0	1
101	M11	1	max	.129	2	2.216	2	.077	4	.033	1	.056	1	6.21	2
102			min	-1.716	4	.071	4	-.02	1	0	4	0	4	-.418	4
103		2	max	.129	2	2.18	2	.039	4	.033	1	.079	4	3.188	2
104			min	-1.716	4	.035	4	-.02	1	0	4	.025	2	-.491	4
105		3	max	.129	2	2.145	2	0	4	.033	1	.106	4	.291	1
106			min	-1.716	4	0	4	-.02	1	0	4	0	1	-.515	4
107		4	max	.129	2	2.109	2	-.018	2	.033	1	.079	4	-.317	3
108			min	-1.716	4	-.042	3	-.038	4	0	4	-.028	1	-2.711	2
109		5	max	.129	2	2.074	2	-.018	2	.033	1	0	4	-.23	3
110			min	-1.716	4	-.085	3	-.077	4	0	4	-.056	1	-5.587	2

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[k]	LC	y Shear...	LC	z Shear...	LC	Torque[...	LC	y-y Mo...	LC	z-z Mo...	LC
111	M12	1	max	4.483	4	4.33	2	-1.697	3	3.229	2	0	1	0	1
112			min	.038	2	1.836	3	-3.53	2	.804	3	0	1	0	1
113		2	max	.237	4	.018	2	-.018	2	.015	2	1.09	4	-.941	3
114			min	-3.367	2	-1.812	4	-.789	4	-1.95	4	-.701	2	-3.971	2
115		3	max	.237	4	-.017	2	-.057	2	.015	2	.006	4	1.287	3
116			min	-3.367	2	-1.847	4	-.789	4	-1.95	4	-.753	2	-3.971	2
117		4	max	.237	4	-.053	2	-.095	2	.015	2	-.782	1	3.574	3
118			min	-3.367	2	-1.883	4	-.789	4	-1.95	4	-1.078	4	-3.923	2
119		5	max	-.022	2	4.73	4	3.709	2	3.121	3	0	1	0	1
120			min	-3.975	4	-4.261	2	-1.875	4	-3.121	2	0	1	0	1
121	M13	1	max	1.558	4	.085	3	0	4	.03	1	.036	1	1.041	3
122			min	.073	1	-2.135	2	-.013	1	0	4	0	4	-5.743	2
123		2	max	1.558	4	.042	3	0	4	.03	1	.018	1	.954	3
124			min	.073	1	-2.17	2	-.013	1	0	4	0	4	-2.783	2
125		3	max	1.558	4	0	4	0	4	.03	1	0	1	.925	3
126			min	.073	1	-2.206	2	-.013	1	0	4	0	1	.225	2
127		4	max	1.558	4	-.035	4	0	4	.03	1	0	4	3.283	2
128			min	.073	1	-2.241	2	-.013	1	0	4	-.018	1	.944	4
129		5	max	1.558	4	-.071	4	0	4	.03	1	0	4	6.389	2
130			min	.073	1	-2.277	2	-.013	1	0	4	-.036	1	1.017	4
131	M14	1	max	1.92	4	8.15	2	-.344	3	1.975	4	0	1	0	1
132			min	-.029	1	7.76	3	-2.131	2	.541	2	0	1	0	1
133		2	max	1.92	4	8.115	2	-.344	3	1.975	4	-.473	3	-10.641	3
134			min	-.029	1	7.717	3	-2.131	2	.541	2	-2.93	2	-11.182	2
135		3	max	-.192	3	.002	1	-.029	2	.014	1	-.001	3	-1.83	4
136			min	-1.513	2	-4.846	4	-1.416	4	-6.843	4	-2.037	2	-12.563	2
137		4	max	.037	1	5.718	4	2.188	2	1.279	4	.541	4	7.838	4
138			min	-2.345	4	-8.126	2	-.393	4	-.68	1	-3.008	2	-11.198	2
139		5	max	.037	1	5.682	4	2.188	2	1.279	4	0	1	0	1
140			min	-2.345	4	-8.161	2	-.393	4	-.68	1	0	1	0	1
141	M15	1	max	.347	4	2.941	2	.077	4	.054	1	0	4	7.741	2
142			min	-.012	2	.071	4	.018	2	0	4	-.056	1	.499	3
143		2	max	.347	4	2.906	2	.038	4	.054	1	.079	4	3.722	2
144			min	-.012	2	.035	4	.018	2	0	4	-.028	1	.412	3
145		3	max	.347	4	2.87	2	.02	1	.054	1	.106	4	.599	4
146			min	-.012	2	0	4	0	4	0	4	0	1	-.357	1
147		4	max	.347	4	2.835	2	.02	1	.054	1	.079	4	.623	4
148			min	-.012	2	-.042	3	-.039	4	0	4	.025	2	-4.171	2
149		5	max	.347	4	2.799	2	.02	1	.054	1	.056	1	.696	4
150			min	-.012	2	-.085	3	-.077	4	0	4	0	4	-8.045	2
151	M16	1	max	-.033	2	-4.275	3	2.212	2	.37	1	0	1	0	1
152			min	-2.345	4	-5.746	2	.345	3	-1.279	4	0	1	0	1
153		2	max	-.033	2	-4.317	3	2.173	2	.37	1	3.014	2	7.925	2
154			min	-2.345	4	-5.781	2	.345	3	-1.279	4	.475	3	5.907	3
155		3	max	1.511	2	4.846	4	1.416	4	6.843	4	2.038	2	8.9	2
156			min	-.21	4	0	1	-.033	1	.014	2	-.002	4	-2.651	3
157		4	max	1.92	4	5.77	2	.392	4	-.169	2	2.936	2	7.91	2
158			min	.024	2	-8.061	4	-2.116	2	-1.975	4	-.539	4	-11.108	4
159		5	max	1.92	4	5.735	2	.392	4	-.169	2	0	1	0	1
160			min	.024	2	-8.096	4	-2.154	2	-1.975	4	0	1	0	1
161	M17	1	max	-.006	1	.085	3	.016	1	.042	1	0	4	-1.021	3
162			min	-.344	4	-2.808	2	0	4	0	4	-.045	1	-8.072	2

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[k]	LC	y Shear...	LC	z Shear...	LC	Torque[...	LC	y-y Mo...	LC	z-z Mo...	LC
163		2	max	-.006	1	.042	3	.016	1	.042	1	0	4	-1.108	3
164			min	-.344	4	-2.844	2	0	4	0	4	-.023	1	-4.186	2
165		3	max	-.006	1	0	4	.016	1	.042	1	0	1	-.252	2
166			min	-.344	4	-2.879	2	0	4	0	4	0	1	-1.139	4
167		4	max	-.006	1	-.035	4	.016	1	.042	1	.023	1	3.732	2
168			min	-.344	4	-2.915	2	0	4	0	4	0	4	-1.114	4
169		5	max	-.006	1	-.071	4	.016	1	.042	1	.045	1	7.764	2
170			min	-.344	4	-2.95	2	0	4	0	4	0	4	-1.041	4
171	M18	1	max	1.023	4	-4.432	1	-1.365	1	-1.997	1	2.315	2	.354	1
172			min	-2.163	2	-10.6	4	-2.136	4	-9.605	4	1.625	3	-8.122	4
173		2	max	1.023	4	-4.474	1	-1.365	1	-1.997	1	.191	2	8.223	2
174			min	-2.163	2	-10.635	4	-2.136	4	-9.605	4	-1.087	4	4.961	3
175		3	max	0	4	0	2	0	2	0	3	0	1	-.002	4
176			min	0	1	0	3	0	3	0	2	0	4	-.003	1
177		4	max	2.217	2	10.635	4	2.136	4	9.605	4	-.167	1	6.477	4
178			min	.898	3	-8.046	2	-1.546	2	-3.714	2	-1.087	4	-10.557	2
179		5	max	2.217	2	10.6	4	2.136	4	9.605	4	1.85	4	.694	1
180			min	.898	3	-8.081	2	-1.546	2	-3.714	2	-2.317	2	-8.122	4
181	M19	1	max	2.102	2	12.869	4	2.129	4	10.683	4	-1.62	3	8.818	4
182			min	-1.024	4	7.715	1	1.3	1	3.536	1	-2.246	2	.528	2
183		2	max	2.102	2	12.833	4	2.129	4	10.683	4	1.083	4	-8.428	3
184			min	-1.024	4	7.673	1	1.3	1	3.536	1	-.198	2	-10.539	2
185		3	max	0	1	0	3	0	3	0	2	0	4	-.002	2
186			min	0	4	0	2	0	2	0	3	0	1	-.003	3
187		4	max	-.899	3	5.852	2	1.487	2	2.614	2	1.083	4	8.204	2
188			min	-2.049	2	-12.833	4	-2.129	4	-10.683	4	.175	1	-8.851	4
189		5	max	-.899	3	5.816	2	1.487	2	2.614	2	2.244	2	8.818	4
190			min	-2.049	2	-12.869	4	-2.129	4	-10.683	4	-1.845	4	.183	2
191	M20	1	max	0	3	.023	3	0	4	0	4	0	2	.006	3
192			min	0	2	.019	2	0	1	0	1	0	4	.005	2
193		2	max	0	3	.012	3	0	4	0	4	0	2	0	4
194			min	0	2	.01	2	0	1	0	1	0	4	0	1
195		3	max	0	3	0	4	0	4	0	4	0	2	-.002	2
196			min	0	2	0	1	0	1	0	1	0	3	-.003	3
197		4	max	0	3	-.01	4	0	4	0	4	0	4	0	2
198			min	0	2	-.012	1	0	1	0	1	0	1	0	3
199		5	max	0	3	-.019	4	0	4	0	4	0	4	.006	1
200			min	0	2	-.023	1	0	1	0	1	0	1	.005	4
201	M21	1	max	0	2	.023	3	0	1	0	1	0	4	.006	3
202			min	0	3	.019	2	0	4	0	4	0	1	.005	2
203		2	max	0	2	.012	3	0	1	0	1	0	4	0	4
204			min	0	3	.01	2	0	4	0	4	0	1	0	1
205		3	max	0	2	0	4	0	1	0	1	0	2	-.002	4
206			min	0	3	0	1	0	4	0	4	0	3	-.003	1
207		4	max	0	2	-.01	4	0	1	0	1	0	2	0	2
208			min	0	3	-.012	1	0	4	0	4	0	4	0	3
209		5	max	0	2	-.019	4	0	1	0	1	0	2	.006	1
210			min	0	3	-.023	1	0	4	0	4	0	4	.005	4
211	M22	1	max	.782	4	12.776	4	-.343	1	4.38	3	.731	2	10.233	2
212			min	-2.501	2	-5.909	2	-2.23	4	-6.542	2	-2.414	4	-19.488	4
213		2	max	.782	4	12.776	4	-.343	1	4.38	3	.52	2	13.367	2
214			min	-2.501	2	-5.909	2	-2.23	4	-6.542	2	-3.596	4	-26.263	4

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[k]	LC	y Shear...	LC	z Shear...	LC	Torque[...	LC	y-y Mo...	LC	z-z Mo...	LC
215		3	max	2.66	2	12.776	4	.475	2	8.391	2	.31	2	-21.008	1
216			min	-.787	4	-7.987	2	-2.23	4	4.373	4	-4.791	4	-33.039	4
217		4	max	2.66	2	10.693	4	2.233	4	8.391	2	.523	2	21.739	4
218			min	-.787	4	-7.987	2	.423	1	-2.491	4	-3.606	4	-17.885	2
219		5	max	2.66	2	10.693	4	2.233	4	8.391	2	.774	2	16.068	4
220			min	-.787	4	-7.987	2	.423	1	-2.491	4	-2.422	4	-13.65	2
221	M23	1	max	2.539	2	12.776	4	2.23	4	-4.373	4	2.414	4	-12.888	1
222			min	.686	3	7.604	1	-.433	2	-8.387	2	.637	1	-19.488	4
223		2	max	2.539	2	12.776	4	2.23	4	-4.373	4	3.596	4	-16.921	1
224			min	.686	3	7.604	1	-.433	2	-8.387	2	.438	1	-26.263	4
225		3	max	-.691	3	12.776	4	2.23	4	-4.373	4	4.791	4	-20.953	1
226			min	-2.622	2	7.604	1	-.433	2	-8.387	2	.274	1	-33.039	4
227		4	max	-.691	3	10.693	4	.437	2	6.546	2	3.606	4	21.739	4
228			min	-2.622	2	4.541	1	-2.233	4	1.615	3	.48	1	10.373	1
229		5	max	-.691	3	10.693	4	.437	2	6.546	2	2.422	4	16.068	4
230			min	-2.622	2	4.541	1	-2.233	4	1.615	3	.686	1	7.965	1
231	M24	1	max	1.086	2	-5.71	3	1.514	4	0	1	-.668	1	-4.29	3
232			min	.373	3	-7.566	2	.891	1	0	1	-1.136	4	-5.682	2
233		2	max	1.086	2	-5.715	3	1.514	4	0	1	-.501	1	-3.219	3
234			min	.373	3	-7.571	2	.891	1	0	1	-.852	4	-4.263	2
235		3	max	1.086	2	-5.72	3	1.514	4	0	1	-.334	1	-2.147	3
236			min	.373	3	-7.575	2	.891	1	0	1	-.568	4	-2.843	2
237		4	max	1.086	2	-5.724	3	1.514	4	0	1	-.167	1	-1.074	3
238			min	.373	3	-7.58	2	.891	1	0	1	-.284	4	-1.422	2
239		5	max	1.086	2	-5.729	3	1.514	4	0	1	0	1	0	1
240			min	.373	3	-7.585	2	.891	1	0	1	0	1	0	1
241	M25	1	max	1.068	2	3.899	4	1.482	4	0	1	.759	2	2.917	4
242			min	-.387	4	-7.399	2	-1.012	2	0	1	-1.111	4	-5.556	2
243		2	max	1.068	2	3.894	4	1.482	4	0	1	.569	2	2.186	4
244			min	-.387	4	-7.403	2	-1.012	2	0	1	-.834	4	-4.168	2
245		3	max	1.068	2	3.889	4	1.482	4	0	1	.379	2	1.457	4
246			min	-.387	4	-7.408	2	-1.012	2	0	1	-.556	4	-2.78	2
247		4	max	1.068	2	3.885	4	1.482	4	0	1	.19	2	.728	4
248			min	-.387	4	-7.413	2	-1.012	2	0	1	-.278	4	-1.39	2
249		5	max	1.068	2	3.88	4	1.482	4	0	1	0	1	0	1
250			min	-.387	4	-7.418	2	-1.012	2	0	1	0	1	0	1
251	M26	1	max	.412	4	5.429	2	1.002	2	0	1	1.136	4	4.064	2
252			min	-.98	2	-5.882	4	-1.514	4	0	1	-.752	2	-4.419	4
253		2	max	.412	4	5.424	2	1.002	2	0	1	.852	4	3.047	2
254			min	-.98	2	-5.887	4	-1.514	4	0	1	-.564	2	-3.316	4
255		3	max	.412	4	5.419	2	1.002	2	0	1	.568	4	2.03	2
256			min	-.98	2	-5.892	4	-1.514	4	0	1	-.376	2	-2.211	4
257		4	max	.412	4	5.414	2	1.002	2	0	1	.284	4	1.015	2
258			min	-.98	2	-5.897	4	-1.514	4	0	1	-.188	2	-1.106	4
259		5	max	.412	4	5.409	2	1.002	2	0	1	0	1	0	1
260			min	-.98	2	-5.902	4	-1.514	4	0	1	0	1	0	1
261	M27	1	max	-.344	3	5.445	2	-.882	1	0	1	1.111	4	4.076	2
262			min	-.963	2	2.979	3	-1.482	4	0	1	.662	1	2.227	3
263		2	max	-.344	3	5.44	2	-.882	1	0	1	.834	4	3.056	2
264			min	-.963	2	2.975	3	-1.482	4	0	1	.496	1	1.669	3
265		3	max	-.344	3	5.435	2	-.882	1	0	1	.556	4	2.036	2
266			min	-.963	2	2.97	3	-1.482	4	0	1	.331	1	1.112	3

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[k]	LC	y Shear...	LC	z Shear...	LC	Torque[...	LC	y-y Mo...	LC	z-z Mo...	LC
267		4	max	-.344	3	5.43	2	-.882	1	0	1	.278	4	1.018	2
268			min	-.963	2	2.965	3	-1.482	4	0	1	.165	1	.555	3
269		5	max	-.344	3	5.426	2	-.882	1	0	1	0	1	0	1
270			min	-.963	2	2.96	3	-1.482	4	0	1	0	1	0	1
271	M28	1	max	-.985	3	-6.288	1	-2.961	1	0	1	3.159	4	-4.723	1
272			min	-3.736	2	-6.655	4	-4.212	4	0	1	2.221	1	-4.998	4
273		2	max	-.985	3	-6.292	1	-2.961	1	0	1	2.369	4	-3.544	1
274			min	-3.736	2	-6.66	4	-4.212	4	0	1	1.666	1	-3.75	4
275		3	max	-.985	3	-6.297	1	-2.961	1	0	1	1.579	4	-2.363	1
276			min	-3.736	2	-6.665	4	-4.212	4	0	1	1.11	1	-2.501	4
277		4	max	-.985	3	-6.302	1	-2.961	1	0	1	.79	4	-1.182	1
278			min	-3.736	2	-6.669	4	-4.212	4	0	1	.555	1	-1.251	4
279		5	max	-.985	3	-6.307	1	-2.961	1	0	1	0	1	0	1
280			min	-3.736	2	-6.674	4	-4.212	4	0	1	0	1	0	1
281	M29	1	max	1.103	4	4.428	4	3.398	2	0	1	3.185	4	3.314	4
282			min	-3.445	2	-6.323	2	-4.247	4	0	1	-2.548	2	-4.75	2
283		2	max	1.103	4	4.424	4	3.398	2	0	1	2.389	4	2.484	4
284			min	-3.445	2	-6.328	2	-4.247	4	0	1	-1.911	2	-3.564	2
285		3	max	1.103	4	4.419	4	3.398	2	0	1	1.593	4	1.655	4
286			min	-3.445	2	-6.333	2	-4.247	4	0	1	-1.274	2	-2.377	2
287		4	max	1.103	4	4.414	4	3.398	2	0	1	.796	4	.827	4
288			min	-3.445	2	-6.338	2	-4.247	4	0	1	-.637	2	-1.189	2
289		5	max	1.103	4	4.409	4	3.398	2	0	1	0	1	0	1
290			min	-3.445	2	-6.342	2	-4.247	4	0	1	0	1	0	1
291	M30	1	max	3.842	2	4.192	2	4.212	4	0	1	2.509	2	3.136	2
292			min	-1.086	4	-6.655	4	-3.345	2	0	1	-3.159	4	-4.998	4
293		2	max	3.842	2	4.187	2	4.212	4	0	1	1.881	2	2.351	2
294			min	-1.086	4	-6.66	4	-3.345	2	0	1	-2.369	4	-3.75	4
295		3	max	3.842	2	4.182	2	4.212	4	0	1	1.254	2	1.566	2
296			min	-1.086	4	-6.665	4	-3.345	2	0	1	-1.579	4	-2.501	4
297		4	max	3.842	2	4.177	2	4.212	4	0	1	.627	2	.783	2
298			min	-1.086	4	-6.669	4	-3.345	2	0	1	-.79	4	-1.251	4
299		5	max	3.842	2	4.172	2	4.212	4	0	1	0	1	0	1
300			min	-1.086	4	-6.674	4	-3.345	2	0	1	0	1	0	1
301	M31	1	max	3.551	2	4.428	4	4.247	4	0	1	-2.272	1	3.314	4
302			min	.986	3	3.293	1	3.03	1	0	1	-3.185	4	2.462	1
303		2	max	3.551	2	4.424	4	4.247	4	0	1	-1.704	1	2.484	4
304			min	.986	3	3.288	1	3.03	1	0	1	-2.389	4	1.845	1
305		3	max	3.551	2	4.419	4	4.247	4	0	1	-1.136	1	1.655	4
306			min	.986	3	3.283	1	3.03	1	0	1	-1.593	4	1.229	1
307		4	max	3.551	2	4.414	4	4.247	4	0	1	-.568	1	.827	4
308			min	.986	3	3.278	1	3.03	1	0	1	-.796	4	.614	1
309		5	max	3.551	2	4.409	4	4.247	4	0	1	0	1	0	1
310			min	.986	3	3.273	1	3.03	1	0	1	0	1	0	1

Envelope Member Section Stresses

	Member	Sec		Axial[ksi]	LC	y Shear[...	LC	z Shear[...	LC	y-Top[ksi]	LC	y-Bot[ksi]	LC	z-Top[ksi]	LC	z-Bot[ksi]	LC
1	M1	1	max	.285	1	.785	2	0	2	0	3	14.678	2	14.686	4	0	2
2			min	.192	2	0	3	-.786	4	-14.678	2	0	3	0	2	-14.686	4
3		2	max	.258	1	.754	2	0	2	0	3	9.291	2	9.297	4	0	2

Envelope Member Section Stresses (Continued)

	Member	Sec		Axial[ksi]	LC	y Shear[...	LC	z Shear[...	LC	y-Top[ksi]	LC	y-Bot[ksi]	LC	z-Top[ksi]	LC	z-Bot[ksi]	LC
4			min	.175	2	0	3	-.754	4	-9.291	2	0	3	0	2	-9.297	4
5		3	max	.232	1	.723	2	0	2	0	3	4.123	2	4.127	4	0	2
6			min	.158	2	0	3	-.723	4	-4.123	2	0	3	0	2	-4.127	4
7		4	max	.026	1	.036	1	0	2	0	3	.138	1	.141	3	0	2
8			min	.017	2	0	3	-.036	3	-.138	1	0	3	0	2	-.141	3
9		5	max	0	1	.004	1	0	2	0	1	0	1	0	1	0	1
10			min	0	1	0	3	-.004	3	0	1	0	1	0	1	0	1
11	M2	1	max	1.006	2	-.078	4	.465	4	5.458	2	-1.367	4	.002	1	0	4
12			min	.54	3	-.35	2	0	1	1.367	4	-5.458	2	0	4	-.002	1
13		2	max	.99	2	-.078	4	.465	4	.354	2	-.234	4	6.773	4	.009	1
14			min	.521	3	-.35	2	0	1	.234	4	-.354	2	-.009	1	-6.773	4
15		3	max	.974	2	-.078	4	.465	4	-.899	4	4.75	2	13.547	4	.02	1
16			min	.502	3	-.35	2	0	1	-4.75	2	.899	4	-.02	1	-13.547	4
17		4	max	1.491	2	.673	2	.004	1	.656	3	1.93	2	9.549	4	.017	1
18			min	1.079	3	.012	3	-.698	4	-1.93	2	-.656	3	-.017	1	-9.549	4
19		5	max	1.464	2	.635	2	.004	1	7.569	2	-.833	3	.038	1	0	4
20			min	1.035	3	.012	3	-.621	4	.833	3	-7.569	2	0	4	-.038	1
21	M3	1	max	.99	2	.037	4	.424	4	5.4	2	.641	4	.011	1	0	4
22			min	-.318	4	-.346	2	-.001	1	-.641	4	-5.4	2	0	4	-.011	1
23		2	max	.974	2	.037	4	.462	4	.357	2	.098	4	6.454	4	.011	1
24			min	-.334	4	-.346	2	-.001	1	-.098	4	-.357	2	-.011	1	-6.454	4
25		3	max	.959	2	.037	4	.499	4	.444	4	4.686	2	13.454	4	.032	1
26			min	-.349	4	-.346	2	-.001	1	-4.686	2	-.444	4	-.032	1	-13.454	4
27		4	max	1.48	2	.652	2	.005	1	-.215	3	1.973	2	9.848	4	.025	1
28			min	-.724	4	-.013	4	-.695	4	-1.973	2	.215	3	-.025	1	-9.848	4
29		5	max	1.465	2	.652	2	.005	1	7.527	2	.532	4	.05	1	0	4
30			min	-.74	4	-.013	4	-.657	4	-.532	4	-7.527	2	0	4	-.05	1
31	M4	1	max	.542	4	.079	3	.465	4	4.555	2	1.397	3	0	4	.002	1
32			min	-.766	2	-.268	2	0	2	-1.397	3	-4.555	2	-.002	1	0	4
33		2	max	.526	4	.079	3	.465	4	.38	2	.242	3	6.773	4	-.005	2
34			min	-.782	2	-.305	2	0	2	-.242	3	-.38	2	.005	2	-6.773	4
35		3	max	.511	4	.079	3	.465	4	.913	3	4.34	2	13.547	4	-.01	2
36			min	-.798	2	-.343	2	0	2	-4.34	2	-.913	3	.01	2	-13.547	4
37		4	max	1.103	4	.686	2	-.003	2	-.65	4	2.216	2	9.549	4	-.01	2
38			min	-1.101	2	-.014	4	-.698	4	-2.216	2	.65	4	.01	2	-9.549	4
39		5	max	1.077	4	.611	2	-.003	2	7.203	2	.852	4	0	4	.038	1
40			min	-1.127	2	-.014	4	-.621	4	-.852	4	-7.203	2	-.038	1	0	4
41	M5	1	max	-.224	3	-.023	3	.424	4	4.533	2	-.387	3	0	4	.011	1
42			min	-.767	2	-.266	2	.001	2	.387	3	-4.533	2	-.011	1	0	4
43		2	max	-.243	3	-.023	3	.462	4	.391	2	-.054	3	6.454	4	-.007	2
44			min	-.782	2	-.303	2	.001	2	.054	3	-.391	2	.007	2	-6.454	4
45		3	max	-.262	3	-.023	3	.499	4	-.278	3	4.298	2	13.454	4	-.024	2
46			min	-.798	2	-.34	2	.001	2	-4.298	2	.278	3	.024	2	-13.454	4
47		4	max	-.534	3	.664	2	-.004	2	.335	4	2.246	2	9.848	4	-.019	2
48			min	-1.112	2	.011	3	-.694	4	-2.246	2	-.335	4	.019	2	-9.848	4
49		5	max	-.552	3	.626	2	-.004	2	7.153	2	-.369	3	0	4	.05	1
50			min	-1.127	2	.011	3	-.657	4	.369	3	-7.153	2	-.05	1	0	4
51	M6	1	max	.212	4	-1.209	3	-.18	3	0	1	0	1	0	1	0	1
52			min	0	1	-2.158	2	-.313	2	0	1	0	1	0	1	0	1
53		2	max	.012	4	.482	4	.001	1	-2.807	4	6.217	2	.346	4	.214	2
54			min	-.133	2	.018	2	-.08	4	-6.217	2	2.807	4	-.214	2	-.346	4
55		3	max	.012	4	.472	4	.001	1	-.741	4	6.16	2	0	4	.21	2

Envelope Member Section Stresses (Continued)

	Member	Sec		Axial[ksi]	LC	y Shear[...	LC	z Shear[...	LC	y-Top[ksi]	LC	y-Bot[ksi]	LC	z-Top[ksi]	LC	z-Bot[ksi]	LC
56			min	-.133	2	.008	2	-.08	4	-6.16	2	.741	4	-.21	2	0	4
57		4	max	.012	4	.462	4	.001	1	1.281	4	6.147	2	-.18	1	.345	4
58			min	-.133	2	-.002	2	-.08	4	-6.147	2	-1.281	4	-.345	4	.18	1
59		5	max	0	2	2.126	2	.31	2	0	1	0	1	0	1	0	1
60			min	-.183	4	-.676	4	-.192	4	0	1	0	1	0	1	0	1
61	M7	1	max	.07	4	.024	3	.022	4	.364	4	-.13	1	0	1	0	2
62			min	.017	2	-.044	2	0	1	.13	1	-.364	4	0	2	0	1
63		2	max	.07	4	.012	3	.011	4	.431	4	.038	1	.072	4	0	2
64			min	.017	2	-.055	2	0	1	-.038	1	-.431	4	0	2	-.072	4
65		3	max	.07	4	0	4	0	2	.453	4	.26	1	.096	4	0	1
66			min	.017	2	-.065	2	0	1	-.26	1	-.453	4	0	1	-.096	4
67		4	max	.07	4	-.01	4	0	2	.431	4	.535	1	.072	4	0	1
68			min	.017	2	-.075	2	-.011	4	-.535	1	-.431	4	0	1	-.072	4
69		5	max	.07	4	-.021	4	0	2	.364	4	.863	1	0	2	0	1
70			min	.017	2	-.086	2	-.022	4	-.863	1	-.364	4	0	1	0	2
71	M8	1	max	0	1	1.596	2	.302	2	0	1	0	1	0	1	0	1
72			min	-.183	4	.467	3	.171	3	0	1	0	1	0	1	0	1
73		2	max	.132	2	.009	2	.08	4	4.617	2	-.753	3	.194	2	.345	4
74			min	.011	3	-.462	4	.011	1	.753	3	-4.617	2	-.345	4	-.194	2
75		3	max	.132	2	0	2	.08	4	4.636	2	1.036	3	.223	2	0	3
76			min	.011	3	-.472	4	0	2	-1.036	3	-4.636	2	0	3	-.223	2
77		4	max	.132	2	-.011	2	.08	4	4.61	2	2.878	3	.346	4	-.179	1
78			min	.011	3	-.482	4	-.01	2	-2.878	3	-4.61	2	.179	1	-.346	4
79		5	max	.212	4	1.21	4	.199	4	0	1	0	1	0	1	0	1
80			min	0	2	-1.593	2	-.305	2	0	1	0	1	0	1	0	1
81	M9	1	max	.02	1	.087	2	0	4	-.849	2	1.044	3	.008	1	0	4
82			min	-.055	4	.021	4	0	1	-1.044	3	.849	2	0	4	-.008	1
83		2	max	.02	1	.077	2	0	4	-.493	2	.964	3	.004	1	0	4
84			min	-.055	4	.01	4	0	1	-.964	3	.493	2	0	4	-.004	1
85		3	max	.02	1	.067	2	0	4	-.181	2	.938	3	0	1	0	1
86			min	-.055	4	0	4	0	1	-.938	3	.181	2	0	1	0	1
87		4	max	.02	1	.057	2	0	4	.087	2	.964	3	0	4	.004	1
88			min	-.055	4	-.012	3	0	1	-.964	3	-.087	2	-.004	1	0	4
89		5	max	.02	1	.046	2	0	4	.31	2	1.044	3	0	4	.008	1
90			min	-.055	4	-.024	3	0	1	-1.044	3	-.31	2	-.008	1	0	4
91	M10	1	max	.004	1	-1.367	3	1.064	2	0	1	0	1	0	1	0	1
92			min	-.524	4	-1.841	2	.49	3	0	1	0	1	0	1	0	1
93		2	max	.443	2	.545	4	.228	4	-3.174	4	5.305	2	.77	2	.983	4
94			min	.022	3	.016	2	-.019	1	-5.305	2	3.174	4	-.983	4	-.77	2
95		3	max	.443	2	.534	4	.228	4	-.837	4	5.26	2	.699	2	-.004	3
96			min	.022	3	.005	2	-.019	1	-5.26	2	.837	4	.004	3	-.699	2
97		4	max	.443	2	.524	4	.228	4	1.456	4	5.258	2	.993	4	-.54	1
98			min	.022	3	-.005	2	-.019	1	-5.258	2	-1.456	4	.54	1	-.993	4
99		5	max	.591	4	1.82	2	.547	4	0	1	0	1	0	1	0	1
100			min	-.006	1	-.768	4	-1.013	2	0	1	0	1	0	1	0	1
101	M11	1	max	.017	2	.641	2	.022	4	.381	4	5.66	2	.051	1	0	4
102			min	-.226	4	.021	4	-.006	1	-5.66	2	-.381	4	0	4	-.051	1
103		2	max	.017	2	.631	2	.011	4	.447	4	2.905	2	.072	4	-.023	2
104			min	-.226	4	.01	4	-.006	1	-2.905	2	-.447	4	.023	2	-.072	4
105		3	max	.017	2	.62	2	0	4	.47	4	.265	1	.096	4	0	1
106			min	-.226	4	0	4	-.006	1	-.265	1	-.47	4	0	1	-.096	4
107		4	max	.017	2	.61	2	-.005	2	2.471	2	-.289	3	.072	4	.025	1

Envelope Member Section Stresses (Continued)

	Member	Sec		Axial[ksi]	LC	y Shear[...	LC	z Shear[...	LC	y-Top[ksi]	LC	y-Bot[ksi]	LC	z-Top[ksi]	LC	z-Bot[ksi]	LC
108			min	-.226	4	-.012	3	-.011	4	.289	3	-2.471	2	-.025	1	-.072	4
109		5	max	.017	2	.6	2	-.005	2	5.092	2	-.21	3	0	4	.051	1
110			min	-.226	4	-.025	3	-.022	4	.21	3	-5.092	2	-.051	1	0	4
111	M12	1	max	.591	4	1.253	2	-.491	3	0	1	0	1	0	1	0	1
112			min	.005	2	.531	3	-1.021	2	0	1	0	1	0	1	0	1
113		2	max	.031	4	.005	2	-.005	2	3.619	2	-.858	3	.993	4	.639	2
114			min	-.444	2	-.524	4	-.228	4	.858	3	-3.619	2	-.639	2	-.993	4
115		3	max	.031	4	-.005	2	-.016	2	3.619	2	1.173	3	.005	4	.686	2
116			min	-.444	2	-.534	4	-.228	4	-1.173	3	-3.619	2	-.686	2	-.005	4
117		4	max	.031	4	-.015	2	-.028	2	3.575	2	3.257	3	-.713	1	.983	4
118			min	-.444	2	-.545	4	-.228	4	-3.257	3	-3.575	2	-.983	4	.713	1
119		5	max	-.003	2	1.368	4	1.073	2	0	1	0	1	0	1	0	1
120			min	-.524	4	-1.232	2	-.542	4	0	1	0	1	0	1	0	1
121	M13	1	max	.206	4	.025	3	0	4	5.234	2	.949	3	.033	1	0	4
122			min	.01	1	-.618	2	-.004	1	-.949	3	-5.234	2	0	4	-.033	1
123		2	max	.206	4	.012	3	0	4	2.537	2	.87	3	.016	1	0	4
124			min	.01	1	-.628	2	-.004	1	-.87	3	-2.537	2	0	4	-.016	1
125		3	max	.206	4	0	4	0	4	-.205	2	.843	3	0	1	0	1
126			min	.01	1	-.638	2	-.004	1	-.843	3	.205	2	0	1	0	1
127		4	max	.206	4	-.01	4	0	4	-.86	4	2.992	2	0	4	.016	1
128			min	.01	1	-.648	2	-.004	1	-2.992	2	.86	4	-.016	1	0	4
129		5	max	.206	4	-.02	4	0	4	-.927	4	5.823	2	0	4	.033	1
130			min	.01	1	-.659	2	-.004	1	-5.823	2	.927	4	-.033	1	0	4
131	M14	1	max	.253	4	2.357	2	-.1	3	0	1	0	1	0	1	0	1
132			min	-.004	1	2.245	3	-.616	2	0	1	0	1	0	1	0	1
133		2	max	.253	4	2.347	2	-.1	3	10.191	2	-9.698	3	-.431	3	2.67	2
134			min	-.004	1	2.232	3	-.616	2	9.698	3	-10.191	2	-2.67	2	.431	3
135		3	max	-.025	3	0	1	-.008	2	11.45	2	-1.668	4	-.001	3	1.857	2
136			min	-.2	2	-1.402	4	-.41	4	1.668	4	-11.45	2	-1.857	2	.001	3
137		4	max	.005	1	1.654	4	.633	2	10.205	2	7.143	4	.493	4	2.742	2
138			min	-.309	4	-2.35	2	-.114	4	-7.143	4	-10.205	2	-2.742	2	-.493	4
139		5	max	.005	1	1.644	4	.633	2	0	1	0	1	0	1	0	1
140			min	-.309	4	-2.361	2	-.114	4	0	1	0	1	0	1	0	1
141	M15	1	max	.046	4	.851	2	.022	4	-.455	3	7.055	2	0	4	.051	1
142			min	-.002	2	.021	4	.005	2	-7.055	2	.455	3	-.051	1	0	4
143		2	max	.046	4	.84	2	.011	4	-.376	3	3.392	2	.072	4	.026	1
144			min	-.002	2	.01	4	.005	2	-3.392	2	.376	3	-.026	1	-.072	4
145		3	max	.046	4	.83	2	.006	1	.326	1	.545	4	.096	4	0	1
146			min	-.002	2	0	4	0	4	-.545	4	-.326	1	0	1	-.096	4
147		4	max	.046	4	.82	2	.006	1	3.802	2	.568	4	.072	4	-.023	2
148			min	-.002	2	-.012	3	-.011	4	-.568	4	-3.802	2	.023	2	-.072	4
149		5	max	.046	4	.81	2	.006	1	7.332	2	.634	4	.051	1	0	4
150			min	-.002	2	-.025	3	-.022	4	-.634	4	-7.332	2	0	4	-.051	1
151	M16	1	max	-.004	2	-1.237	3	.64	2	0	1	0	1	0	1	0	1
152			min	-.309	4	-1.662	2	.1	3	0	1	0	1	0	1	0	1
153		2	max	-.004	2	-1.249	3	.629	2	-5.384	3	7.223	2	2.747	2	-.433	3
154			min	-.309	4	-1.672	2	.1	3	-7.223	2	5.384	3	.433	3	-2.747	2
155		3	max	.199	2	1.402	4	.41	4	2.416	3	8.111	2	1.858	2	.001	4
156			min	-.028	4	0	1	-.009	1	-8.111	2	-2.416	3	-.001	4	-1.858	2
157		4	max	.253	4	1.669	2	.113	4	10.124	4	7.209	2	2.676	2	.491	4
158			min	.003	2	-2.332	4	-.612	2	-7.209	2	-10.124	4	-.491	4	-2.676	2
159		5	max	.253	4	1.659	2	.113	4	0	1	0	1	0	1	0	1

Envelope Member Section Stresses (Continued)

	Member	Sec		Axial[ksi]	LC	y Shear[...	LC	z Shear[...	LC	y-Top[ksi]	LC	y-Bot[ksi]	LC	z-Top[ksi]	LC	z-Bot[ksi]	LC
160			min	.003	2	-2.342	4	-.623	2	0	1	0	1	0	1	0	1
161	M17	1	max	0	1	.025	3	.005	1	7.357	2	-.931	3	0	4	.041	1
162			min	-.045	4	-.812	2	0	4	.931	3	-7.357	2	-.041	1	0	4
163		2	max	0	1	.012	3	.005	1	3.816	2	-1.01	3	0	4	.021	1
164			min	-.045	4	-.823	2	0	4	1.01	3	-3.816	2	-.021	1	0	4
165		3	max	0	1	0	4	.005	1	1.038	4	-.229	2	0	1	0	1
166			min	-.045	4	-.833	2	0	4	.229	2	-1.038	4	0	1	0	1
167		4	max	0	1	-.01	4	.005	1	1.016	4	3.401	2	.021	1	0	4
168			min	-.045	4	-.843	2	0	4	-3.401	2	-1.016	4	0	4	-.021	1
169		5	max	0	1	-.02	4	.005	1	.949	4	7.076	2	.041	1	0	4
170			min	-.045	4	-.853	2	0	4	-7.076	2	-.949	4	0	4	-.041	1
171	M18	1	max	.135	4	-1.282	1	-.395	1	7.403	4	.322	1	2.11	2	-1.481	3
172			min	-.285	2	-3.066	4	-.618	4	-.322	1	-7.403	4	1.481	3	-2.11	2
173		2	max	.135	4	-1.294	1	-.395	1	-4.521	3	7.494	2	.174	2	.99	4
174			min	-.285	2	-3.076	4	-.618	4	-7.494	2	4.521	3	-.99	4	-.174	2
175		3	max	0	4	0	2	0	1	.003	1	-.002	4	0	1	0	4
176			min	0	1	0	3	0	1	.002	4	-.003	1	0	4	0	1
177		4	max	.292	2	3.076	4	.618	4	9.621	2	5.903	4	-.153	1	.99	4
178			min	.118	3	-2.327	2	-.447	2	-5.903	4	-9.621	2	-.99	4	.153	1
179		5	max	.292	2	3.066	4	.618	4	7.403	4	.632	1	1.686	4	2.112	2
180			min	.118	3	-2.337	2	-.447	2	-.632	1	-7.403	4	-2.112	2	-1.686	4
181	M19	1	max	.277	2	3.722	4	.616	4	-.482	2	8.037	4	-1.476	3	2.047	2
182			min	-.135	4	2.232	1	.376	1	-8.037	4	.482	2	-2.047	2	1.476	3
183		2	max	.277	2	3.712	4	.616	4	9.606	2	-7.681	3	.987	4	.181	2
184			min	-.135	4	2.219	1	.376	1	7.681	3	-9.606	2	-.181	2	-.987	4
185		3	max	0	1	0	3	0	1	.003	3	-.002	2	0	4	0	1
186			min	0	4	0	2	0	1	.002	2	-.003	3	0	1	0	4
187		4	max	-.119	3	1.693	2	.43	2	8.067	4	7.477	2	.987	4	-.16	1
188			min	-.27	2	-3.712	4	-.616	4	-7.477	2	-8.067	4	.16	1	-.987	4
189		5	max	-.119	3	1.682	2	.43	2	-.166	2	8.037	4	2.045	2	1.681	4
190			min	-.27	2	-3.722	4	-.616	4	-8.037	4	.166	2	-1.681	4	-2.045	2
191	M20	1	max	0	3	.007	3	0	4	-.004	2	.005	3	0	2	0	4
192			min	0	2	.006	2	0	1	-.005	3	.004	2	0	4	0	2
193		2	max	0	3	.003	3	0	4	0	1	0	4	0	2	0	4
194			min	0	2	.003	2	0	1	0	4	0	1	0	4	0	2
195		3	max	0	3	0	4	0	4	.003	3	-.002	2	0	2	0	3
196			min	0	2	0	1	0	1	.002	2	-.003	3	0	3	0	2
197		4	max	0	3	-.003	4	0	4	0	3	0	2	0	4	0	1
198			min	0	2	-.003	1	0	1	0	2	0	3	0	1	0	4
199		5	max	0	3	-.006	4	0	4	-.004	4	.005	1	0	4	0	1
200			min	0	2	-.007	1	0	1	-.005	1	.004	4	0	1	0	4
201	M21	1	max	0	2	.007	3	0	1	-.004	2	.005	3	0	4	0	1
202			min	0	3	.006	2	0	4	-.005	3	.004	2	0	1	0	4
203		2	max	0	2	.003	3	0	1	0	1	0	4	0	4	0	1
204			min	0	3	.003	2	0	4	0	4	0	1	0	1	0	4
205		3	max	0	2	0	4	0	1	.003	1	-.002	4	0	2	0	3
206			min	0	3	0	1	0	4	.002	4	-.003	1	0	3	0	2
207		4	max	0	2	-.003	4	0	1	0	3	0	2	0	2	0	4
208			min	0	3	-.003	1	0	4	0	2	0	3	0	4	0	2
209		5	max	0	2	-.006	4	0	1	-.004	4	.005	1	0	2	0	4
210			min	0	3	-.007	1	0	4	-.005	1	.004	4	0	4	0	2
211	M22	1	max	0	4	0	1	0	1	0	1	0	1	0	1	0	1

Envelope Member Section Stresses (Continued)

	Member	Sec		Axial[ksi]	LC	y Shear[...	LC	z Shear[...	LC	y-Top[ksi]	LC	y-Bot[ksi]	LC	z-Top[ksi]	LC	z-Bot[ksi]	LC
212			min	0	2	0	1	0	1	0	1	0	1	0	1	0	1
213		2	max	0	4	0	1	0	1	0	1	0	1	0	1	0	1
214			min	0	2	0	1	0	1	0	1	0	1	0	1	0	1
215		3	max	0	2	0	1	0	1	0	1	0	1	0	1	0	1
216			min	0	4	0	1	0	1	0	1	0	1	0	1	0	1
217		4	max	0	2	0	1	0	1	0	1	0	1	0	1	0	1
218			min	0	4	0	1	0	1	0	1	0	1	0	1	0	1
219		5	max	0	2	0	1	0	1	0	1	0	1	0	1	0	1
220			min	0	4	0	1	0	1	0	1	0	1	0	1	0	1
221	M23	1	max	0	2	0	1	0	1	0	1	0	1	0	1	0	1
222			min	0	3	0	1	0	1	0	1	0	1	0	1	0	1
223		2	max	0	2	0	1	0	1	0	1	0	1	0	1	0	1
224			min	0	3	0	1	0	1	0	1	0	1	0	1	0	1
225		3	max	0	3	0	1	0	1	0	1	0	1	0	1	0	1
226			min	0	2	0	1	0	1	0	1	0	1	0	1	0	1
227		4	max	0	3	0	1	0	1	0	1	0	1	0	1	0	1
228			min	0	2	0	1	0	1	0	1	0	1	0	1	0	1
229		5	max	0	3	0	1	0	1	0	1	0	1	0	1	0	1
230			min	0	2	0	1	0	1	0	1	0	1	0	1	0	1
231	M24	1	max	.143	2	-1.652	3	.438	4	5.178	2	-3.91	3	-.609	1	1.035	4
232			min	.049	3	-2.188	2	.258	1	3.91	3	-5.178	2	-1.035	4	.609	1
233		2	max	.143	2	-1.653	3	.438	4	3.885	2	-2.933	3	-.457	1	.776	4
234			min	.049	3	-2.19	2	.258	1	2.933	3	-3.885	2	-.776	4	.457	1
235		3	max	.143	2	-1.654	3	.438	4	2.591	2	-1.956	3	-.304	1	.518	4
236			min	.049	3	-2.191	2	.258	1	1.956	3	-2.591	2	-.518	4	.304	1
237		4	max	.143	2	-1.656	3	.438	4	1.296	2	-.979	3	-.152	1	.259	4
238			min	.049	3	-2.193	2	.258	1	.979	3	-1.296	2	-.259	4	.152	1
239		5	max	.143	2	-1.657	3	.438	4	0	1	0	1	0	1	0	1
240			min	.049	3	-2.194	2	.258	1	0	1	0	1	0	1	0	1
241	M25	1	max	.141	2	1.128	4	.429	4	5.064	2	2.659	4	.692	2	1.013	4
242			min	-.051	4	-2.14	2	-.293	2	-2.659	4	-5.064	2	-1.013	4	-.692	2
243		2	max	.141	2	1.126	4	.429	4	3.799	2	1.993	4	.519	2	.76	4
244			min	-.051	4	-2.141	2	-.293	2	-1.993	4	-3.799	2	-.76	4	-.519	2
245		3	max	.141	2	1.125	4	.429	4	2.534	2	1.328	4	.346	2	.506	4
246			min	-.051	4	-2.143	2	-.293	2	-1.328	4	-2.534	2	-.506	4	-.346	2
247		4	max	.141	2	1.124	4	.429	4	1.267	2	.663	4	.173	2	.253	4
248			min	-.051	4	-2.144	2	-.293	2	-.663	4	-1.267	2	-.253	4	-.173	2
249		5	max	.141	2	1.122	4	.429	4	0	1	0	1	0	1	0	1
250			min	-.051	4	-2.146	2	-.293	2	0	1	0	1	0	1	0	1
251	M26	1	max	.054	4	1.57	2	.29	2	4.028	4	3.704	2	1.035	4	.685	2
252			min	-.129	2	-1.702	4	-.438	4	-3.704	2	-4.028	4	-.685	2	-1.035	4
253		2	max	.054	4	1.569	2	.29	2	3.022	4	2.777	2	.776	4	.514	2
254			min	-.129	2	-1.703	4	-.438	4	-2.777	2	-3.022	4	-.514	2	-.776	4
255		3	max	.054	4	1.567	2	.29	2	2.015	4	1.85	2	.518	4	.343	2
256			min	-.129	2	-1.704	4	-.438	4	-1.85	2	-2.015	4	-.343	2	-.518	4
257		4	max	.054	4	1.566	2	.29	2	1.008	4	.925	2	.259	4	.171	2
258			min	-.129	2	-1.706	4	-.438	4	-.925	2	-1.008	4	-.171	2	-.259	4
259		5	max	.054	4	1.565	2	.29	2	0	1	0	1	0	1	0	1
260			min	-.129	2	-1.707	4	-.438	4	0	1	0	1	0	1	0	1
261	M27	1	max	-.045	3	1.575	2	-.255	1	-2.03	3	3.715	2	1.013	4	-.603	1
262			min	-.127	2	.862	3	-.429	4	-3.715	2	2.03	3	.603	1	-1.013	4
263		2	max	-.045	3	1.574	2	-.255	1	-1.521	3	2.785	2	.76	4	-.452	1

Envelope Member Section Stresses (Continued)

	Member	Sec		Axial[ksi]	LC	y Shear[...	LC	z Shear[...	LC	y-Top[ksi]	LC	y-Bot[ksi]	LC	z-Top[ksi]	LC	z-Bot[ksi]	LC
264			min	-.127	2	.86	3	-.429	4	-2.785	2	1.521	3	.452	1	-.76	4
265		3	max	-.045	3	1.572	2	-.255	1	-1.013	3	1.856	2	.506	4	-.301	1
266			min	-.127	2	.859	3	-.429	4	-1.856	2	1.013	3	.301	1	-.506	4
267		4	max	-.045	3	1.571	2	-.255	1	-.506	3	.928	2	.253	4	-.151	1
268			min	-.127	2	.858	3	-.429	4	-.928	2	.506	3	.151	1	-.253	4
269		5	max	-.045	3	1.569	2	-.255	1	0	1	0	1	0	1	0	1
270			min	-.127	2	.856	3	-.429	4	0	1	0	1	0	1	0	1
271	M28	1	max	-.13	3	-1.819	1	-.857	1	4.556	4	-4.304	1	2.879	4	-2.024	1
272			min	-.493	2	-1.925	4	-1.218	4	4.304	1	-4.556	4	2.024	1	-2.879	4
273		2	max	-.13	3	-1.82	1	-.857	1	3.418	4	-3.23	1	2.159	4	-1.518	1
274			min	-.493	2	-1.926	4	-1.218	4	3.23	1	-3.418	4	1.518	1	-2.159	4
275		3	max	-.13	3	-1.821	1	-.857	1	2.279	4	-2.154	1	1.439	4	-1.012	1
276			min	-.493	2	-1.928	4	-1.218	4	2.154	1	-2.279	4	1.012	1	-1.439	4
277		4	max	-.13	3	-1.823	1	-.857	1	1.14	4	-1.077	1	.72	4	-.506	1
278			min	-.493	2	-1.929	4	-1.218	4	1.077	1	-1.14	4	.506	1	-.72	4
279		5	max	-.13	3	-1.824	1	-.857	1	0	1	0	1	0	1	0	1
280			min	-.493	2	-1.931	4	-1.218	4	0	1	0	1	0	1	0	1
281	M29	1	max	.145	4	1.281	4	.983	2	4.329	2	3.02	4	2.903	4	2.323	2
282			min	-.454	2	-1.829	2	-1.228	4	-3.02	4	-4.329	2	-2.323	2	-2.903	4
283		2	max	.145	4	1.28	4	.983	2	3.248	2	2.264	4	2.177	4	1.742	2
284			min	-.454	2	-1.83	2	-1.228	4	-2.264	4	-3.248	2	-1.742	2	-2.177	4
285		3	max	.145	4	1.278	4	.983	2	2.166	2	1.509	4	1.452	4	1.161	2
286			min	-.454	2	-1.832	2	-1.228	4	-1.509	4	-2.166	2	-1.161	2	-1.452	4
287		4	max	.145	4	1.277	4	.983	2	1.083	2	.754	4	.726	4	.581	2
288			min	-.454	2	-1.833	2	-1.228	4	-.754	4	-1.083	2	-.581	2	-.726	4
289		5	max	.145	4	1.275	4	.983	2	0	1	0	1	0	1	0	1
290			min	-.454	2	-1.835	2	-1.228	4	0	1	0	1	0	1	0	1
291	M30	1	max	.507	2	1.212	2	1.218	4	4.556	4	2.859	2	2.286	2	2.879	4
292			min	-.143	4	-1.925	4	-.967	2	-2.859	2	-4.556	4	-2.879	4	-2.286	2
293		2	max	.507	2	1.211	2	1.218	4	3.418	4	2.143	2	1.715	2	2.159	4
294			min	-.143	4	-1.926	4	-.967	2	-2.143	2	-3.418	4	-2.159	4	-1.715	2
295		3	max	.507	2	1.21	2	1.218	4	2.279	4	1.428	2	1.143	2	1.439	4
296			min	-.143	4	-1.928	4	-.967	2	-1.428	2	-2.279	4	-1.439	4	-1.143	2
297		4	max	.507	2	1.208	2	1.218	4	1.14	4	.713	2	.572	2	.72	4
298			min	-.143	4	-1.929	4	-.967	2	-.713	2	-1.14	4	-.72	4	-.572	2
299		5	max	.507	2	1.207	2	1.218	4	0	1	0	1	0	1	0	1
300			min	-.143	4	-1.931	4	-.967	2	0	1	0	1	0	1	0	1
301	M31	1	max	.468	2	1.281	4	1.228	4	-2.244	1	3.02	4	-2.071	1	2.903	4
302			min	.13	3	.952	1	.876	1	-3.02	4	2.244	1	-2.903	4	2.071	1
303		2	max	.468	2	1.28	4	1.228	4	-1.682	1	2.264	4	-1.553	1	2.177	4
304			min	.13	3	.951	1	.876	1	-2.264	4	1.682	1	-2.177	4	1.553	1
305		3	max	.468	2	1.278	4	1.228	4	-1.12	1	1.509	4	-1.035	1	1.451	4
306			min	.13	3	.95	1	.876	1	-1.509	4	1.12	1	-1.451	4	1.035	1
307		4	max	.468	2	1.277	4	1.228	4	-.56	1	.754	4	-.518	1	.726	4
308			min	.13	3	.948	1	.876	1	-.754	4	.56	1	-.726	4	.518	1
309		5	max	.468	2	1.275	4	1.228	4	0	1	0	1	0	1	0	1
310			min	.13	3	.947	1	.876	1	0	1	0	1	0	1	0	1

Envelope Joint Reactions

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N35	max	-.985	3	6.677	4	-2.961	1	0	1	0	1	0	1
2		min	-3.736	2	6.326	1	-4.212	4	0	1	0	1	0	1
3	N36	max	1.103	4	6.363	2	3.398	2	0	1	0	1	0	1
4		min	-3.445	2	-4.408	4	-4.246	4	0	1	0	1	0	1
5	N37	max	1.086	4	6.677	4	3.345	2	0	1	0	1	0	1
6		min	-3.842	2	-4.153	2	-4.212	4	0	1	0	1	0	1
7	N38	max	-.986	3	-3.26	1	-3.03	1	0	1	0	1	0	1
8		min	-3.551	2	-4.408	4	-4.246	4	0	1	0	1	0	1
9	N27	max	1.086	2	7.58	2	1.514	4	0	1	0	1	0	1
10		min	.373	3	5.728	3	.891	1	0	1	0	1	0	1
11	N28	max	1.068	2	7.413	2	1.482	4	0	1	0	1	0	1
12		min	-.387	4	-3.88	4	-1.012	2	0	1	0	1	0	1
13	N29	max	.98	2	5.901	4	1.514	4	0	1	0	1	0	1
14		min	-.412	4	-5.413	2	-1.002	2	0	1	0	1	0	1
15	N30	max	.963	2	-2.96	3	1.482	4	0	1	0	1	0	1
16		min	.344	3	-5.429	2	.882	1	0	1	0	1	0	1
17	Totals:	max	0	4	11.758	1	0	2						
18		min	-10.477	2	8.579	4	-10.924	4						

Envelope Joint Displacements

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation...	LC	Y Rotation...	LC	Z Rotation...	LC
1	N1	max	.42	2	-.024	2	1.547	4	5.868e-3	4	9.612e-5	1	1.945e-8	4
2		min	0	4	-.034	3	0	1	6.324e-6	2	-6.462e-8	4	-4.93e-3	2
3	N2	max	1.892	2	-.025	2	3.169	4	1.147e-2	4	9.612e-5	1	1.954e-8	4
4		min	0	4	-.035	3	0	2	6.354e-6	2	-6.462e-8	4	-1.053e-2	2
5	N3	max	0	4	-.025	4	0	2	2.199e-6	1	0	3	-4.492e-4	4
6		min	-.002	2	-.053	2	-.001	4	-5.014e-3	4	-1.856e-6	2	-1.423e-3	2
7	N4	max	0	3	.012	4	0	1	7.589e-6	1	3.05e-5	4	2.007e-4	4
8		min	-.002	2	-.052	2	-.001	4	-4.812e-3	4	2.512e-6	1	-1.41e-3	2
9	N5	max	0	3	.041	2	0	1	7.147e-7	2	0	3	4.614e-4	3
10		min	-.002	2	-.025	3	-.001	4	-5.014e-3	4	-1.856e-6	2	-1.223e-3	2
11	N6	max	0	4	.041	2	0	2	-5.35e-6	2	2.721e-6	2	-1.162e-4	3
12		min	-.002	2	.008	3	-.001	4	-4.812e-3	4	-3.05e-5	4	-1.223e-3	2
13	N7	max	.006	2	-.027	4	.004	4	1.026e-2	4	1.881e-5	1	-4.114e-4	4
14		min	0	4	-.058	2	0	2	-1.866e-5	1	0	4	-2.583e-3	2
15	N8	max	.005	2	.014	4	.004	4	1.01e-2	4	3.049e-5	4	2.086e-4	4
16		min	0	3	-.057	2	0	1	-2.046e-5	1	1.245e-6	2	-2.542e-3	2
17	N9	max	.006	2	.044	2	.004	4	1.026e-2	4	1.881e-5	1	4.165e-4	3
18		min	0	3	-.028	3	0	1	1.195e-5	2	0	4	-2.36e-3	2
19	N10	max	.005	2	.044	2	.004	4	1.01e-2	4	3.743e-6	1	-1.33e-4	3
20		min	0	4	.009	3	0	2	1.399e-5	2	-3.051e-5	4	-2.329e-3	2
21	N11	max	.405	2	-.031	4	1.542	4	2.033e-2	4	8.653e-5	1	4.78e-4	4
22		min	0	3	-.062	2	-.003	1	-2.723e-5	1	-5.659e-8	4	-2.782e-3	2
23	N12	max	.399	2	.016	4	1.542	4	2.045e-2	4	8.81e-5	1	-1.823e-4	3
24		min	0	4	-.061	2	-.004	1	-3.419e-5	1	2.718e-5	3	-2.769e-3	2
25	N13	max	.405	2	.048	2	1.542	4	2.033e-2	4	8.653e-5	1	-4.748e-4	3
26		min	0	4	-.031	3	.002	2	1.472e-5	2	-5.659e-8	4	-2.972e-3	2
27	N14	max	.399	2	.048	2	1.542	4	2.045e-2	4	8.81e-5	1	2.727e-4	4
28		min	0	3	.011	3	.002	2	2.257e-5	2	-3.056e-5	4	-2.957e-3	2

Envelope Joint Displacements (Continued)

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation...	LC	Y Rotation...	LC	Z Rotation...	LC
29	N15	max	.42	2	-.038	4	1.542	4	1.598e-3	4	8.938e-5	4	1.267e-3	4
30		min	0	3	-.143	2	-.003	1	-1.47e-3	2	-1.551e-4	2	-2.566e-3	2
31	N16	max	.419	2	0	4	1.542	4	2.029e-3	4	3.251e-4	2	-5.437e-4	3
32		min	0	4	-.143	2	-.004	1	1.438e-3	1	7.88e-5	3	-2.562e-3	2
33	N17	max	.42	2	.105	2	1.542	4	1.598e-3	4	-7.857e-5	3	-1.248e-3	3
34		min	0	4	-.044	3	.002	2	8.041e-4	1	-1.549e-4	2	-3.039e-3	2
35	N18	max	.419	2	.105	2	1.542	4	2.029e-3	4	3.249e-4	2	7.84e-4	4
36		min	0	3	-.011	3	.002	2	-1.047e-3	2	-8.985e-5	4	-3.035e-3	2
37	N19	max	.42	2	-.068	2	1.547	4	5.868e-3	4	9.612e-5	1	1.982e-8	4
38		min	0	4	-.081	3	-.001	1	6.324e-6	2	-6.456e-8	4	-4.93e-3	2
39	N20	max	.42	2	.02	2	1.547	4	5.868e-3	4	9.612e-5	1	1.907e-8	4
40		min	0	4	-.081	3	0	2	6.324e-6	2	-6.467e-8	4	-4.93e-3	2
41	N21	max	.419	2	.029	4	1.547	4	5.868e-3	4	9.612e-5	1	1.916e-8	4
42		min	0	4	-.073	1	-.001	1	6.324e-6	2	-6.456e-8	4	-4.93e-3	2
43	N22	max	.419	2	.029	4	1.547	4	5.868e-3	4	9.612e-5	1	1.974e-8	4
44		min	0	4	.005	1	0	2	6.324e-6	2	-6.467e-8	4	-4.93e-3	2
45	N23	max	0	3	-.011	4	0	2	1.963e-3	2	5.476e-5	4	-9.265e-4	4
46		min	0	2	-.026	2	-.001	4	9.473e-4	4	-6.698e-5	2	-2.458e-3	2
47	N24	max	0	4	.006	4	0	1	4.705e-4	4	6.554e-5	2	4.027e-4	4
48		min	0	2	-.026	2	-.001	4	-1.939e-3	2	4.911e-5	3	-2.434e-3	2
49	N25	max	0	4	.02	2	0	1	9.622e-4	3	-4.9e-5	3	9.521e-4	3
50		min	0	2	-.011	3	-.001	4	-1.46e-3	2	-6.649e-5	2	-1.968e-3	2
51	N26	max	0	3	.02	2	0	2	1.462e-3	2	6.515e-5	2	-2.289e-4	3
52		min	0	2	.004	3	-.001	4	2.974e-4	3	-5.447e-5	4	-1.97e-3	2
53	N27	max	0	3	0	3	0	1	1.963e-3	2	1.217e-4	4	-1.187e-3	4
54		min	0	2	0	2	0	4	9.473e-4	4	-2.242e-5	2	-2.793e-3	2
55	N28	max	0	4	0	4	0	2	4.705e-4	4	1.2e-4	4	5.745e-4	4
56		min	0	2	0	2	0	4	-1.939e-3	2	1.816e-5	1	-2.762e-3	2
57	N29	max	0	4	0	2	0	2	9.622e-4	3	-1.967e-5	1	1.205e-3	3
58		min	0	2	0	4	0	4	-1.46e-3	2	-1.217e-4	4	-2.208e-3	2
59	N30	max	0	3	0	2	0	1	1.462e-3	2	2.075e-5	2	-3.6e-4	3
60		min	0	2	0	3	0	4	2.974e-4	3	-1.2e-4	4	-2.21e-3	2
61	N31	max	0	2	-.012	4	.003	4	1.679e-3	2	2.326e-4	2	-9.7e-4	4
62		min	0	3	-.034	2	0	2	1.056e-3	4	-1.548e-4	4	-3.459e-3	2
63	N32	max	0	2	.006	4	.004	4	5.185e-4	4	-1.425e-4	3	4.586e-4	4
64		min	0	4	-.034	2	0	1	-1.654e-3	2	-2.092e-4	2	-3.422e-3	2
65	N33	max	0	2	.028	2	.003	4	1.075e-3	3	2.331e-4	2	9.884e-4	3
66		min	0	4	-.012	3	0	1	-1.137e-3	2	1.396e-4	3	-2.932e-3	2
67	N34	max	0	2	.028	2	.004	4	1.142e-3	2	1.582e-4	4	-2.803e-4	3
68		min	0	3	.004	3	0	2	3.238e-4	3	-2.097e-4	2	-2.921e-3	2
69	N35	max	0	2	0	1	0	4	1.679e-3	2	8.513e-5	2	-1.265e-3	4
70		min	0	3	0	4	0	1	1.056e-3	4	-3.41e-4	4	-3.744e-3	2
71	N36	max	0	2	0	4	0	4	5.185e-4	4	-4.905e-5	1	6.538e-4	4
72		min	0	4	0	2	0	2	-1.654e-3	2	-3.459e-4	4	-3.702e-3	2
73	N37	max	0	2	0	2	0	4	1.075e-3	3	3.409e-4	4	1.274e-3	3
74		min	0	4	0	4	0	2	-1.137e-3	2	7.915e-5	1	-3.117e-3	2
75	N38	max	0	2	0	4	0	4	1.142e-3	2	3.459e-4	4	-4.296e-4	3
76		min	0	3	0	1	0	1	3.238e-4	3	-5.924e-5	2	-3.11e-3	2

Envelope AISC 14th(360-10): ASD Steel Code Checks

	Member	Shape	Code Check	Loc[...	LC	Sh...	Loc[ft]	...	LC	Pnc/o...	Pnt/...	Mny...	Mnz...	...	Eqn
1	M1	HSS12.5X...	.442	0	4	.052	0		4	502.346	548...	173...	173...	1	H1-...
2	M2	HSS6x6x6	.544	10.9...	4	.045	11.177	z	4	110.514	208...	36.2...	36.2...	...	H1-...
3	M3	HSS6x6x6	.517	10.9...	4	.043	11.177	z	4	110.514	208...	36.2...	36.2...	...	H1-...
4	M4	HSS6x6x6	.544	10.9...	4	.046	11.177	y	2	110.514	208...	36.2...	36.2...	...	H1-...
5	M5	HSS6x6x6	.517	10.9...	4	.043	11.177	z	4	110.514	208...	36.2...	36.2...	...	H1-...
6	M6	HSS6x6x6	.216	.917	2	.315	.917	y	2	197.374	208...	36.2...	36.2...	...	H1-...
7	M7	HSS6x6x6	.026	5.5	1	.006	5.5	y	2	197.374	208...	36.2...	36.2...	...	H1-...
8	M8	HSS6x6x6	.165	4.583	2	.229	0	y	2	197.374	208...	36.2...	36.2...	...	H1-...
9	M9	HSS6x6x6	.032	5.5	3	.005	0	y	2	197.374	208...	36.2...	36.2...	...	H1-...
10	M10	HSS6x6x6	.254	.917	2	.268	.917	y	2	197.374	208...	36.2...	36.2...	...	H1-...
11	M11	HSS6x6x6	.173	0	2	.040	0	y	2	197.374	208...	36.2...	36.2...	...	H1-...
12	M12	HSS6x6x6	.201	4.583	2	.185	4.583	y	3	197.374	208...	36.2...	36.2...	...	H1-...
13	M13	HSS6x6x6	.177	5.5	2	.041	5.5	y	2	197.374	208...	36.2...	36.2...	...	H1-...
14	M14	HSS6x6x6	.555	3.552	2	.308	3.495	y	4	207.244	208...	36.2...	36.2...	...	H1-...
15	M15	HSS6x6x6	.223	5.5	2	.053	0	y	2	197.374	208...	36.2...	36.2...	...	H1-...
16	M16	HSS6x6x6	.459	3.552	4	.308	2.005	y	4	207.244	208...	36.2...	36.2...	...	H1-...
17	M17	HSS6x6x6	.224	0	2	.053	5.5	y	2	197.374	208...	36.2...	36.2...	...	H1-...
18	M18	HSS6x6x6	.706	3.552	4	.499	3.552	y	4	207.244	208...	36.2...	36.2...	...	H3-6
19	M19	HSS6x6x6	.890	1.948	4	.573	5.5	y	4	207.244	208...	36.2...	36.2...	...	H3-6
20	M20	HSS6x6x6	.000	0	3	.000	0	y	3	207.919	208...	36.2...	36.2...	...	H1-...
21	M21	HSS6x6x6	.000	0	3	.000	0	y	3	207.919	208...	36.2...	36.2...	...	H1-...
22	M24	HSS6x6x6	.180	0	2	.133	.75	y	2	208.572	208...	36.2...	36.2...	...	H1-...
23	M25	HSS6x6x6	.177	0	2	.130	.75	y	2	208.572	208...	36.2...	36.2...	...	H1-...
24	M26	HSS6x6x6	.154	0	4	.103	.75	y	4	208.572	208...	36.2...	36.2...	...	H1-...
25	M27	HSS6x6x6	.135	0	2	.095	0	y	2	208.572	208...	36.2...	36.2...	...	H1-...
26	M28	HSS6x6x6	.228	0	4	.117	.75	y	4	208.572	208...	36.2...	36.2...	...	H1-...
27	M29	HSS6x6x6	.209	0	2	.111	.75	y	2	208.572	208...	36.2...	36.2...	...	H1-...
28	M30	HSS6x6x6	.228	0	4	.117	.75	y	4	208.572	208...	36.2...	36.2...	...	H1-...
29	M31	HSS6x6x6	.182	0	4	.078	0	y	4	208.572	208...	36.2...	36.2...	...	H1-...

Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	1	N35	-3.363	6.326	-2.961	0	0	0
2	1	N36	-3.026	6.055	3.031	0	0	0
3	1	N37	-3.45	-2.998	2.96	0	0	0
4	1	N38	-3.113	-3.26	-3.03	0	0	0
5	1	N27	.963	7.248	.891	0	0	0
6	1	N28	.941	6.933	-.895	0	0	0
7	1	N29	.861	-4.203	-.879	0	0	0
8	1	N30	.841	-4.343	.882	0	0	0
9	1	Totals:	-9.346	11.758	0			
10	1	COG (ft):	X: 0	Y: 19.179	Z: .154			

Joint Reactions

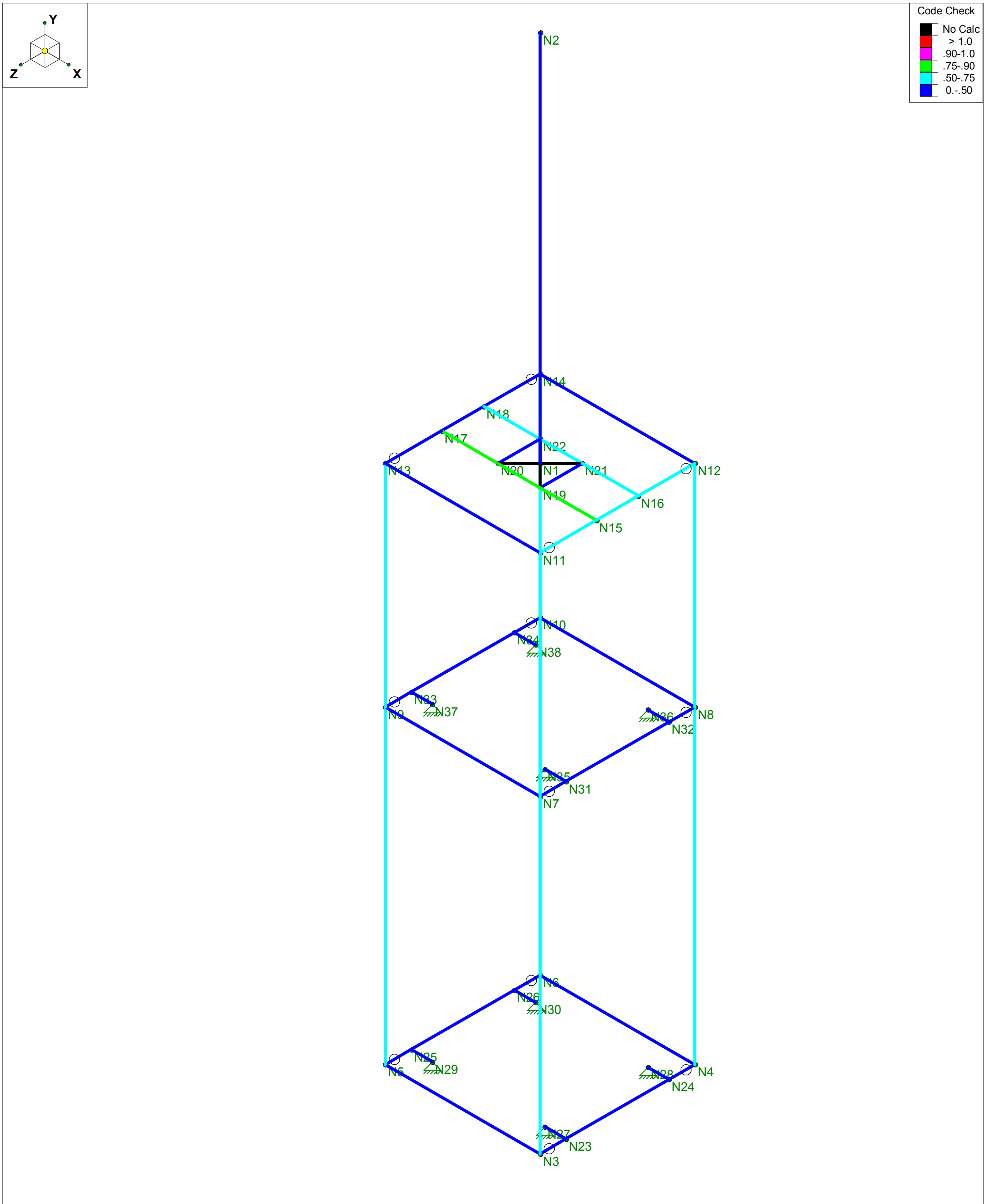
	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	2	N35	-3.736	6.475	-3.337	0	0	0
2	2	N36	-3.445	6.363	3.398	0	0	0
3	2	N37	-3.842	-4.153	3.345	0	0	0
4	2	N38	-3.551	-4.257	-3.404	0	0	0
5	2	N27	1.086	7.58	1.008	0	0	0
6	2	N28	1.068	7.413	-1.012	0	0	0
7	2	N29	.98	-5.413	-1.002	0	0	0
8	2	N30	.963	-5.429	1.005	0	0	0
9	2	Totals:	-10.477	8.579	0			
10	2	COG (ft):	X: 0	Y: 18.427	Z: .085			

Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	3	N35	-.985	6.481	-3.804	0	0	0
2	3	N36	.986	-3.371	-3.818	0	0	0
3	3	N37	.985	6.482	-3.804	0	0	0
4	3	N38	-.986	-3.371	-3.818	0	0	0
5	3	N27	.373	5.728	1.363	0	0	0
6	3	N28	-.344	-2.96	1.328	0	0	0
7	3	N29	-.373	5.729	1.363	0	0	0
8	3	N30	.344	-2.96	1.328	0	0	0
9	3	Totals:	0	11.758	-9.864			
10	3	COG (ft):	X: 0	Y: 19.179	Z: .154			

Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	4	N35	-1.086	6.677	-4.212	0	0	0
2	4	N36	1.103	-4.408	-4.246	0	0	0
3	4	N37	1.086	6.677	-4.212	0	0	0
4	4	N38	-1.103	-4.408	-4.246	0	0	0
5	4	N27	.412	5.901	1.514	0	0	0
6	4	N28	-.387	-3.88	1.482	0	0	0
7	4	N29	-.412	5.901	1.514	0	0	0
8	4	N30	.387	-3.88	1.482	0	0	0
9	4	Totals:	0	8.579	-10.924			
10	4	COG (ft):	X: 0	Y: 18.427	Z: .085			



CENTEK Engineering, INC.		
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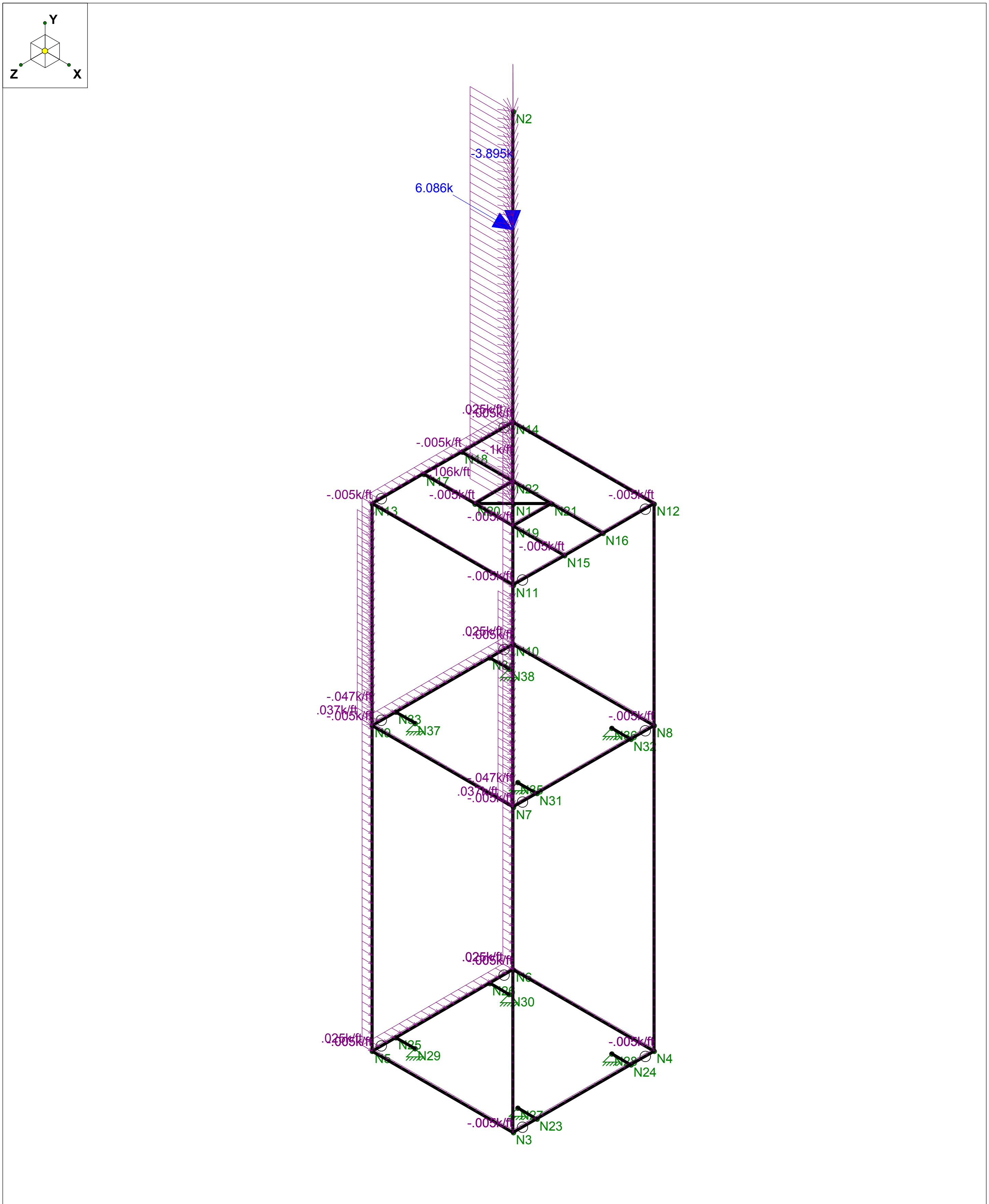
13305 / AT&T CT2117	Unity Check	TIA-EIA.r3d



CENTEK Engineering, INC.		
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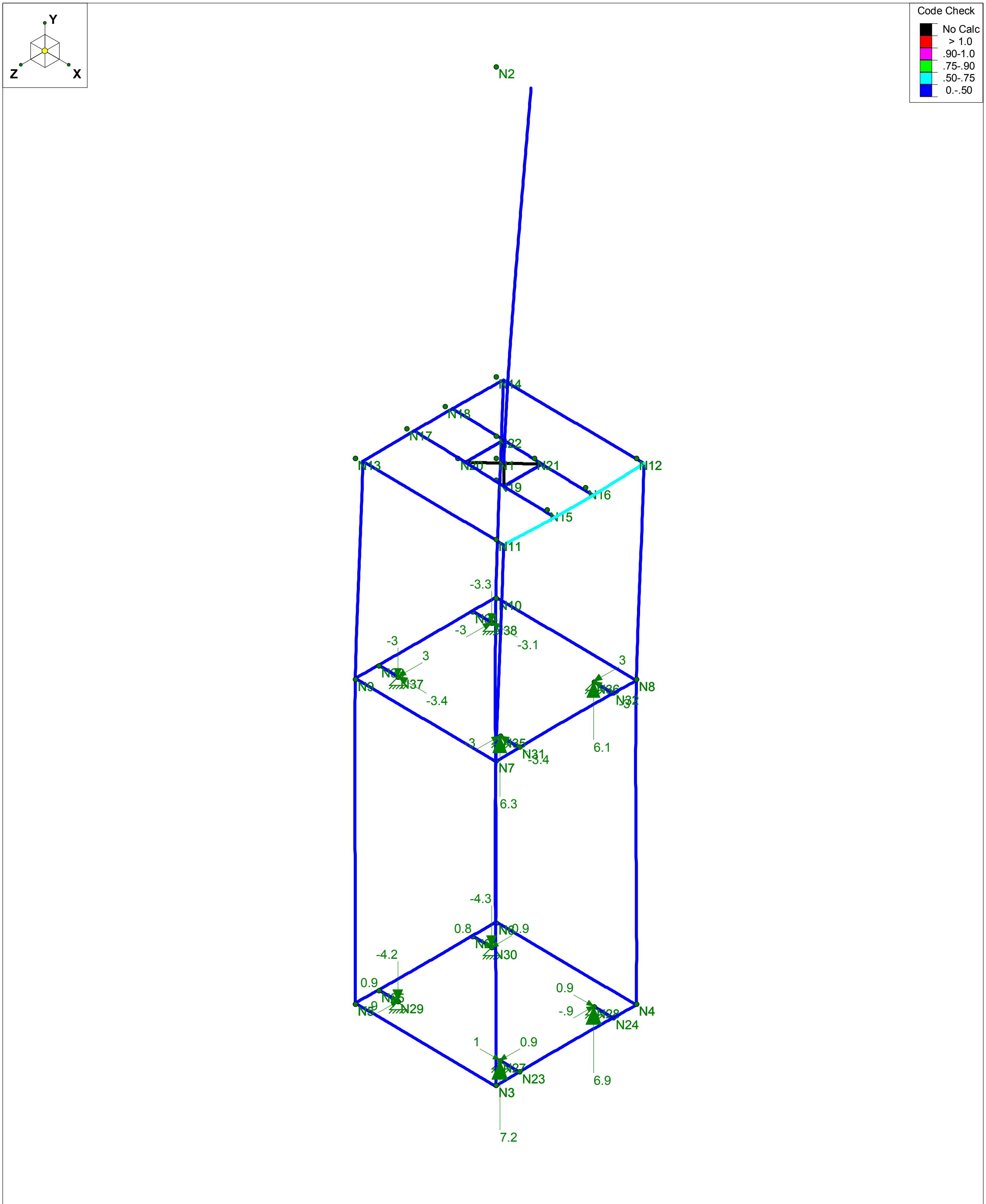

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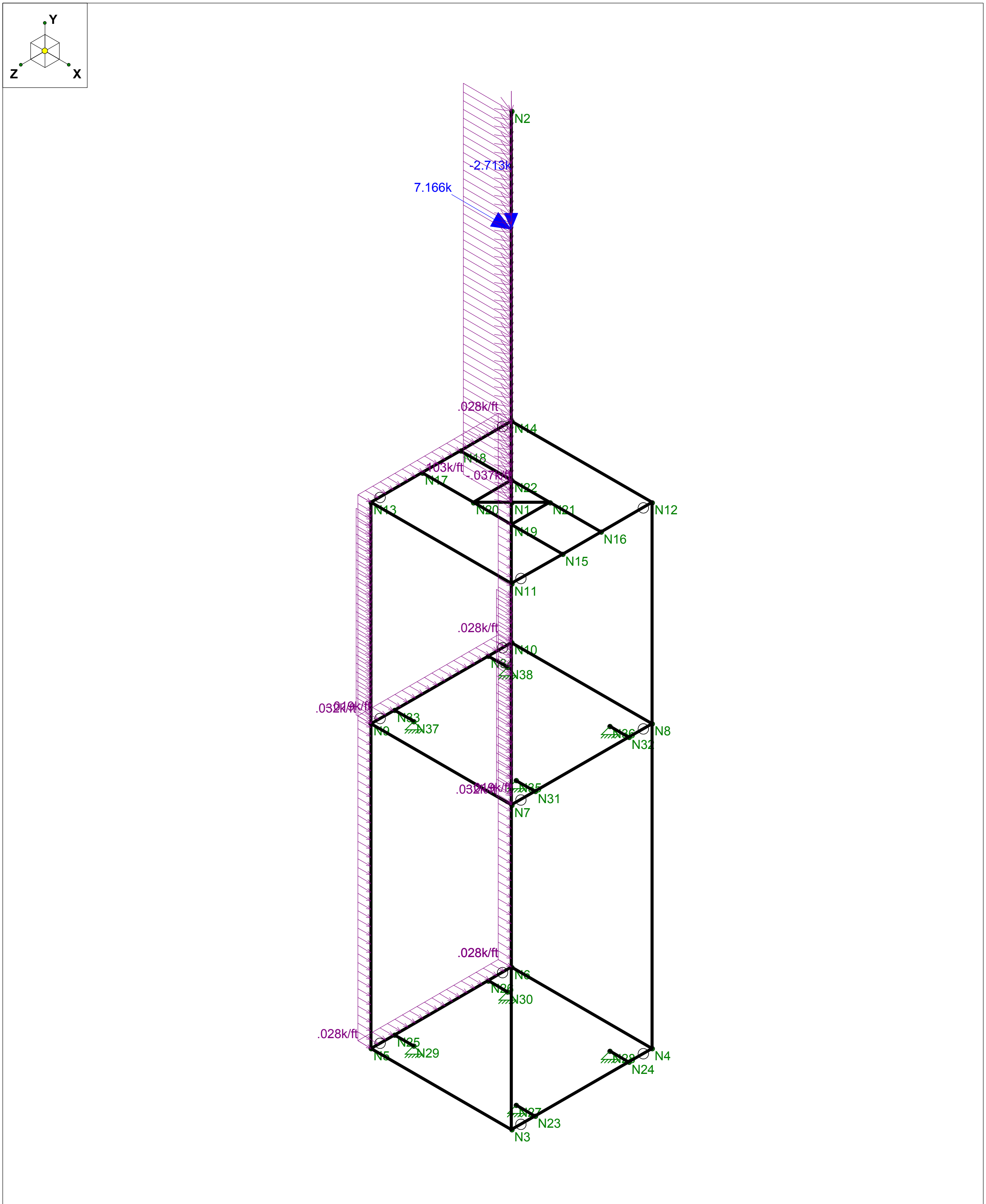

CENTEK Engineering, INC.		
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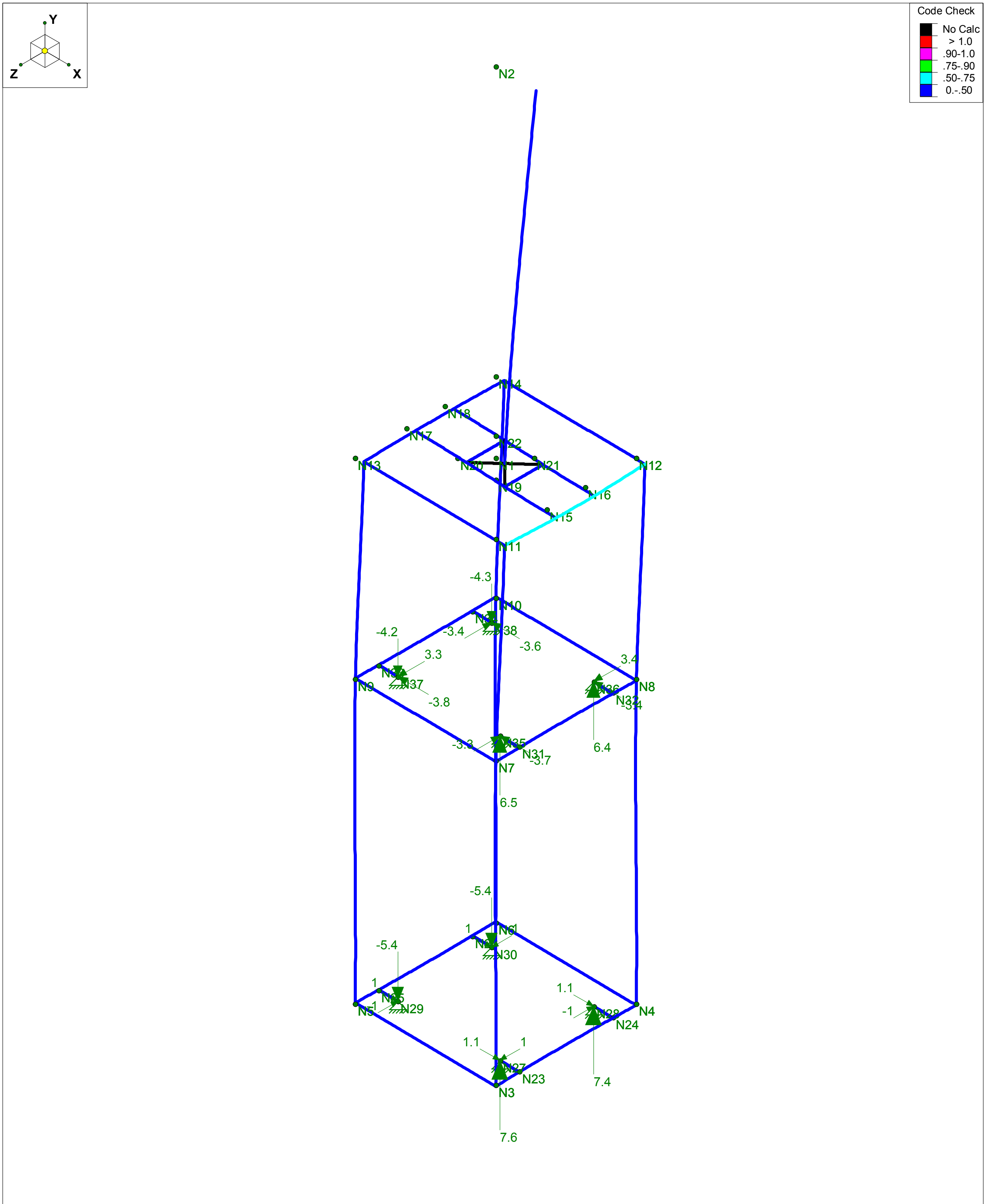

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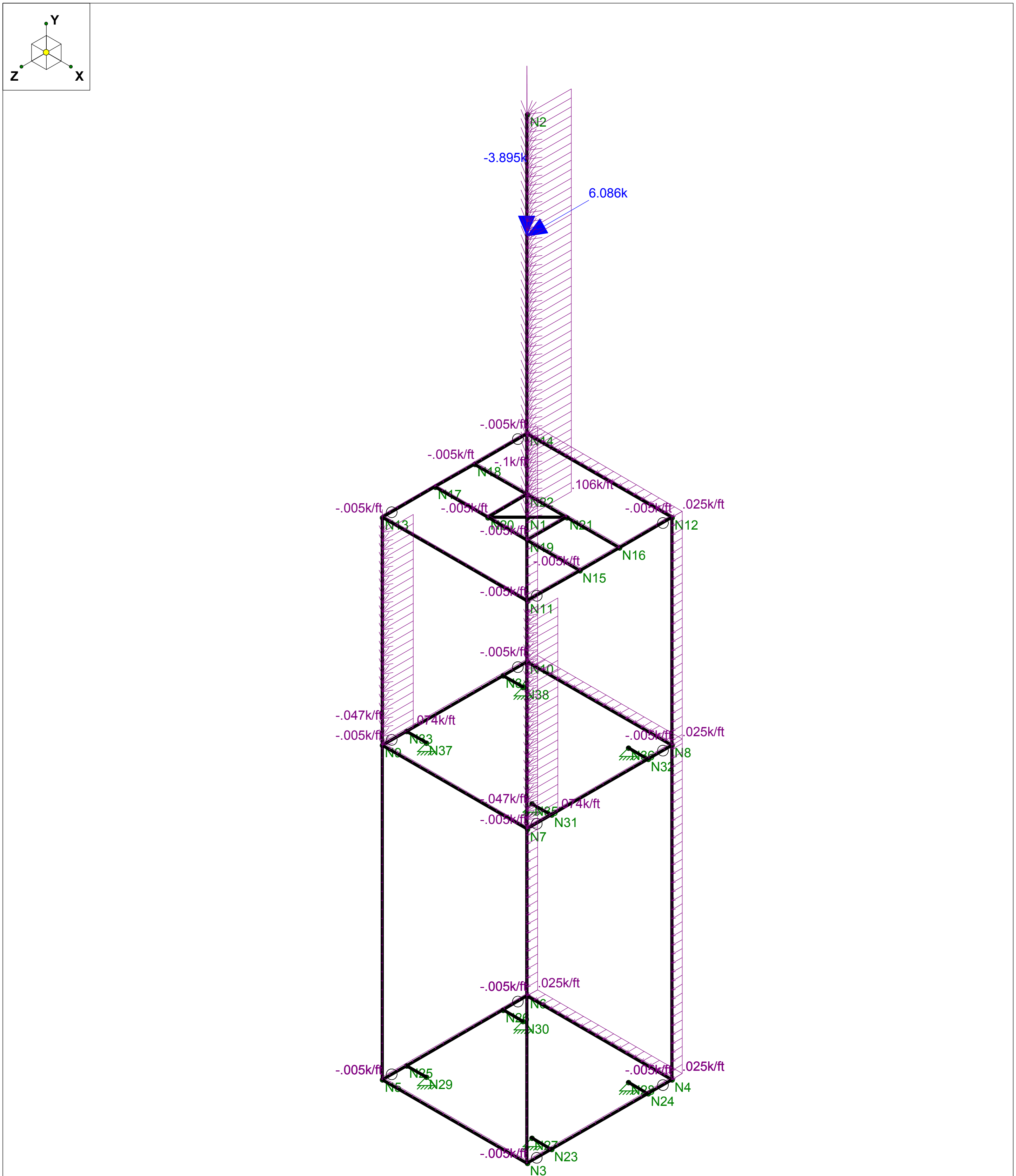
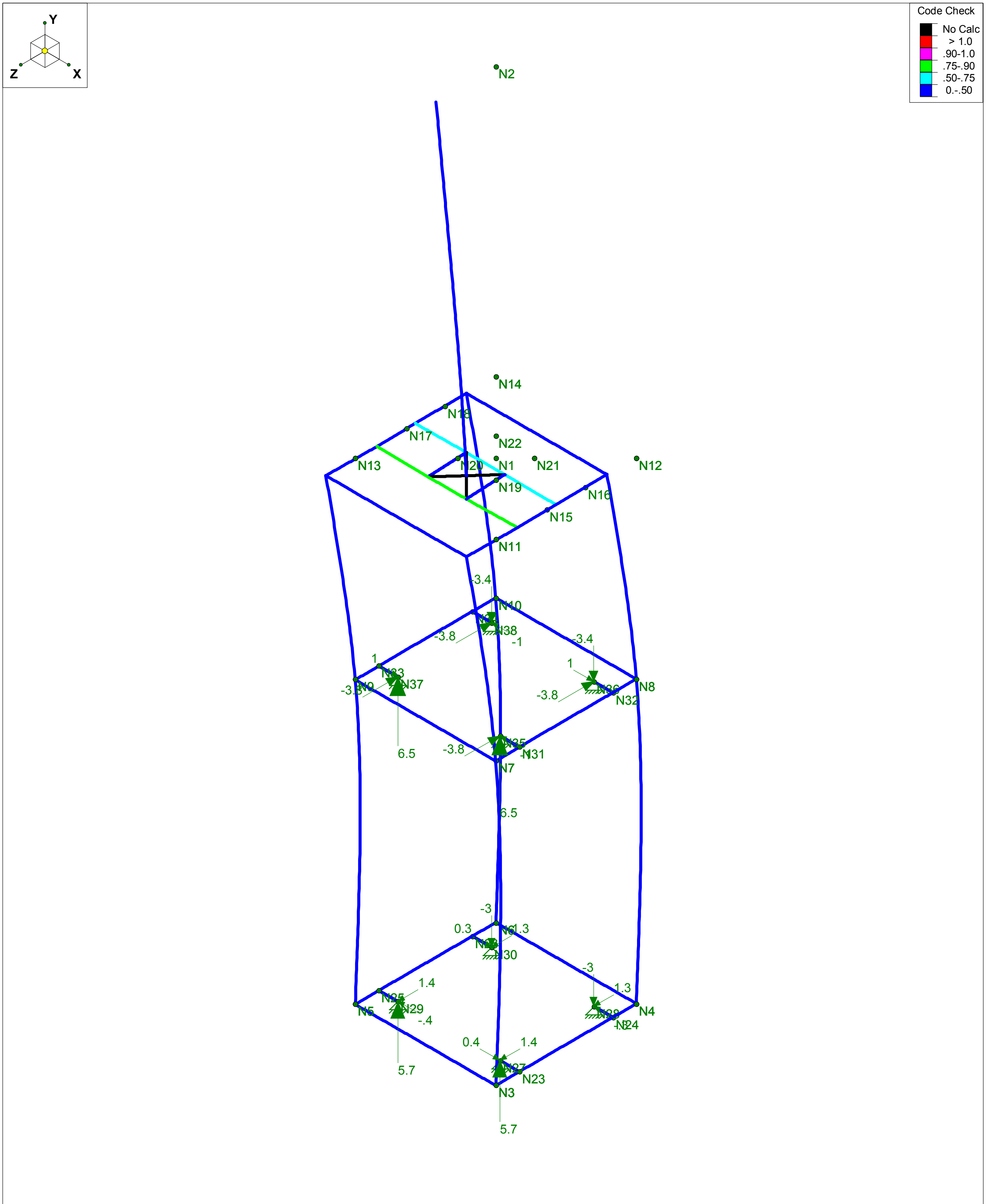
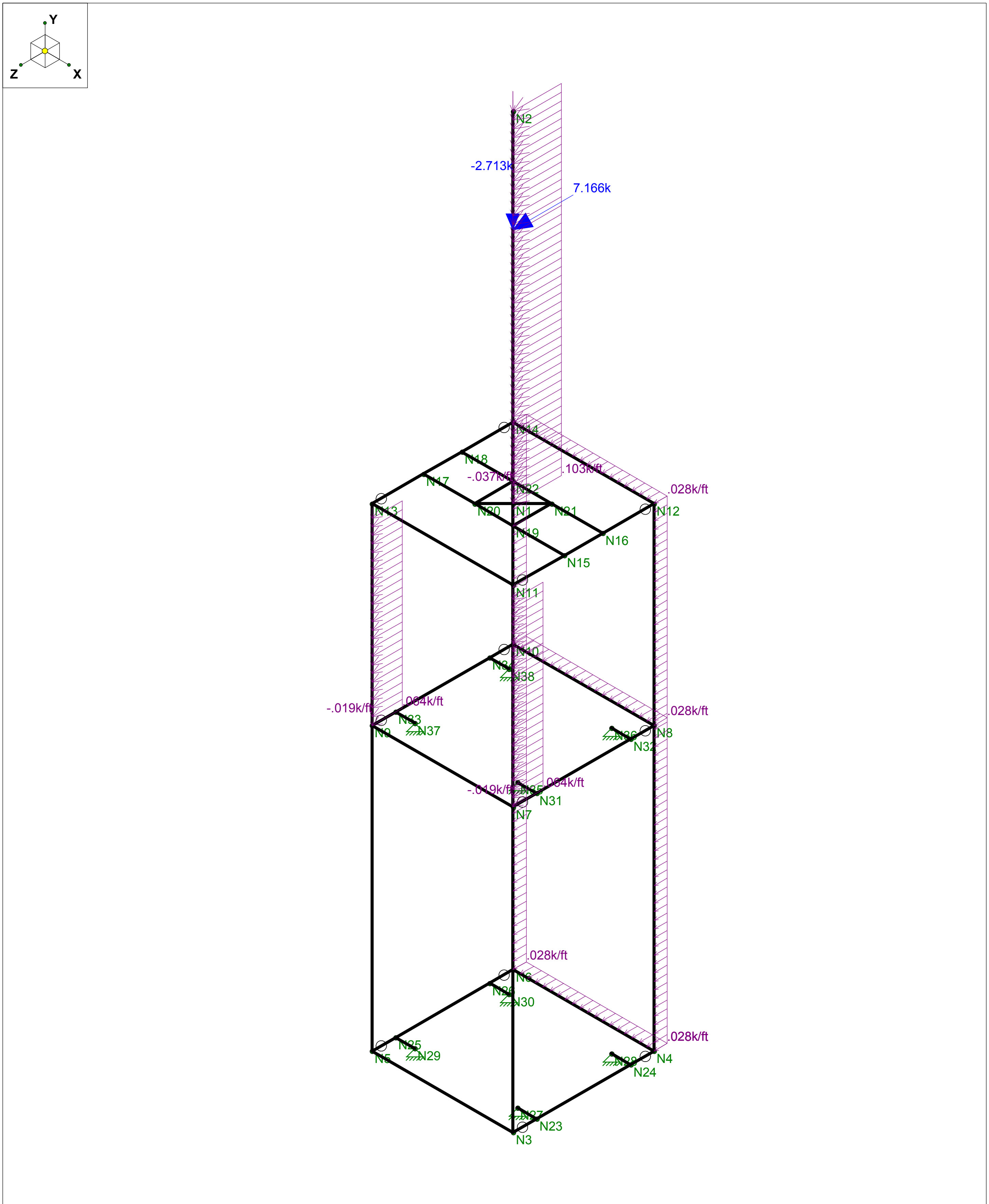


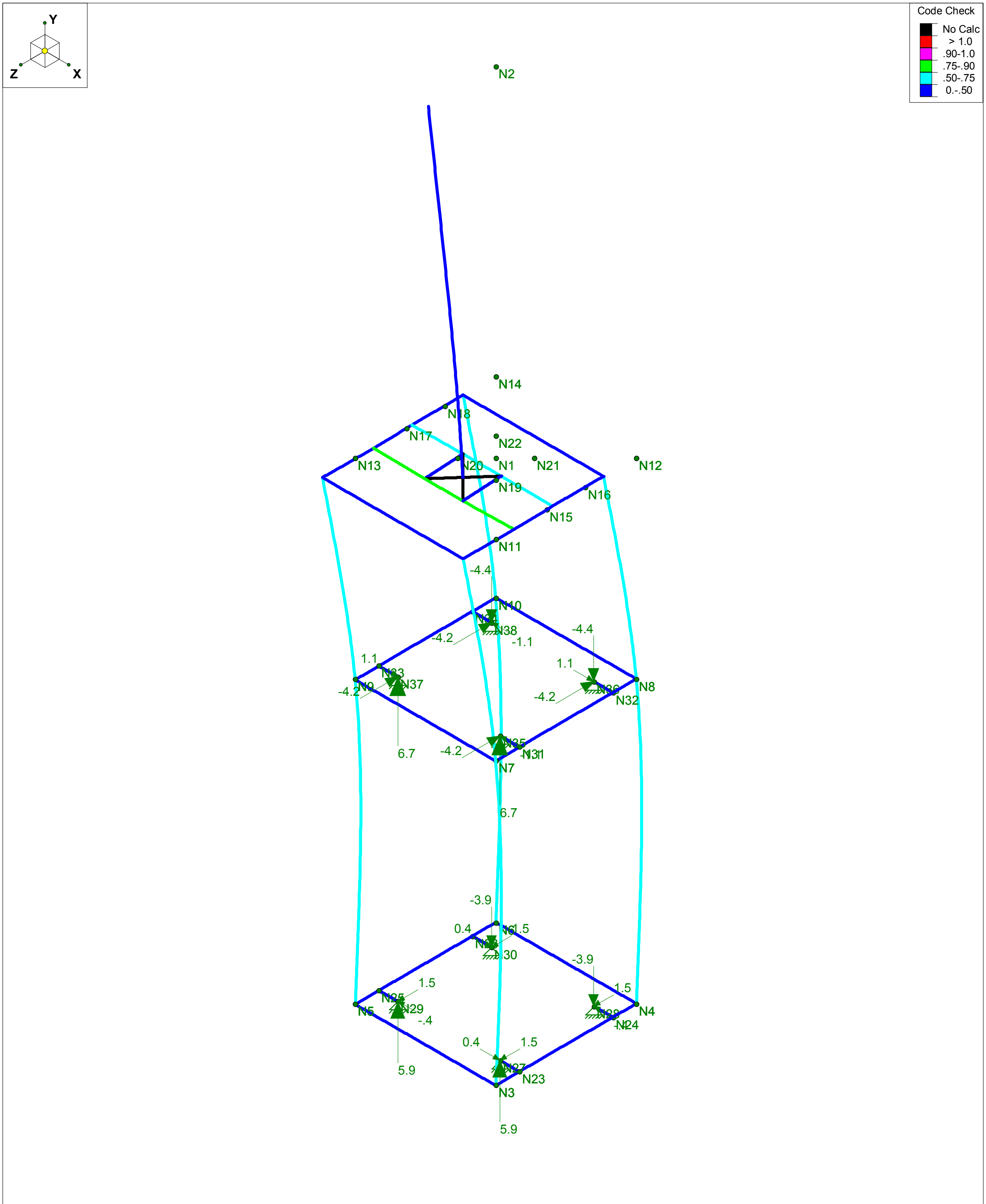
CENTEK Engineering, INC.		
tjl, cfc	CL&P # 783 - Mast	Oct 6, 2014 at 10:03 AM
13305 / AT&T CT2117	LC #3 Loads	TIA-EIA.r3d



CENTEK Engineering, INC.		
tjl, cfc	CL&P # 783 - Mast	Oct 6, 2014 at 10:05 AM
13305 / AT&T CT2117	LC #3 Reactions and Deflected Shape	TIA-EIA.r3d



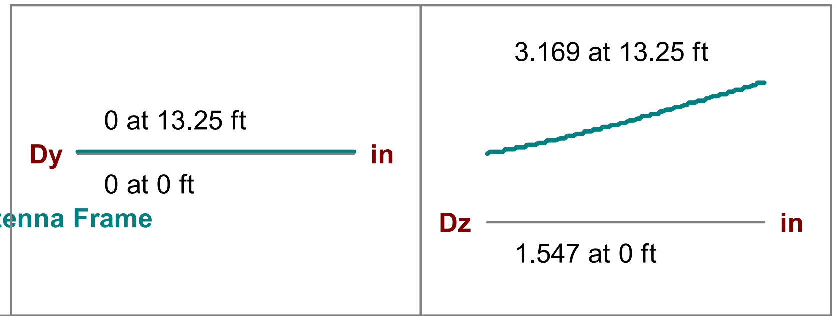
CENTEK Engineering, INC.		
tjl, cfc	CL&P # 783 - Mast	Oct 6, 2014 at 10:03 AM
13305 / AT&T CT2117	LC #4 Loads	TIA-EIA.r3d

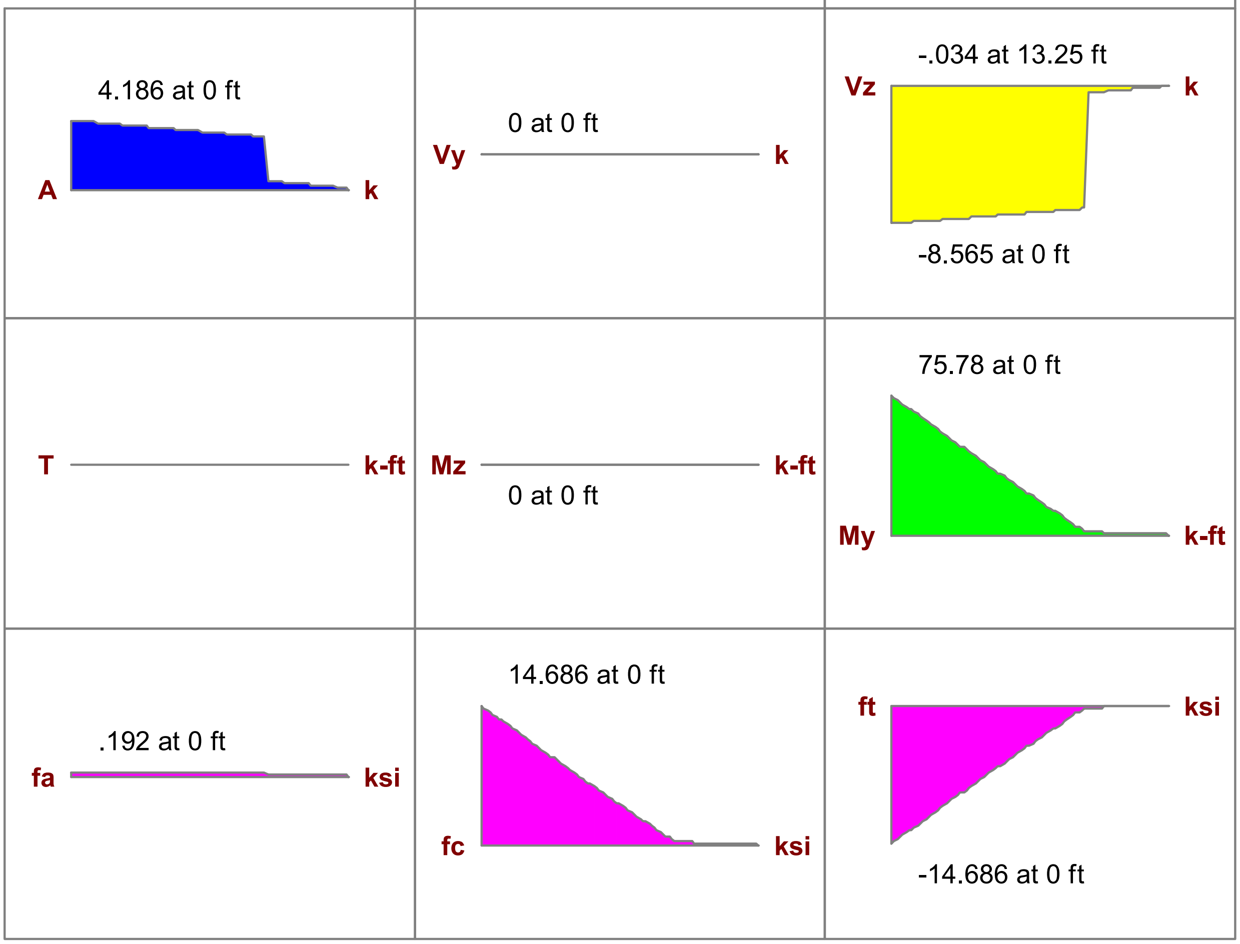


CENTEK Engineering, INC.		
tjl, cfc	CL&P # 783 - Mast	Oct 6, 2014 at 10:06 AM
13305 / AT&T CT2117	LC #4 Reactions and Deflected Shape	TIA-EIA.r3d

Beam: ***M1***

Shape: **HSS12.5X0.625**
Material: **A500 Gr.42**
Length: **13.25 ft**
I Joint: **N1**
J Joint: **N2**
LC 4: z-dir TIA/EIA Wind on Antenna Frame
Code Check: **0.442 (bending)**
Report Based On 97 Sections





AISC 14th(360-10): ASD Code Check
Direct Analysis Method

Max Bending Check	**0.442**	Max Shear Check	**0.052 (s)**
Location	**0 ft**	Location	**0 ft**
Equation	**H1-1b**	Max Defl Ratio	**L/98**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

Seismic Provisions

Fy	**42 ksi**
Pnc/om	**502.346 k**
Pnt/om	**548.263 k**
Mny/om	**173.114 k-ft**
Mnz/om	**173.114 k-ft**
Vny/om	**164.479 k**
Vnz/om	**164.479 k**
Tn/om	**163.034 k-ft**
Cb	**1**

	y-y	z-z
Lb	**13.25 ft**	**13.25 ft**
KL/r	**37.737**	**37.737**

L Comp Flange	**13.25 ft**
Warp Length	**NC**
L-torque	**13.25 ft**
Tau_b	**1**

Anchor Bolt and Base Plate Analysis:

Input Data:

Tower Reactions:

Overturning Moment =	$OM := 76 \cdot ft \cdot kips$	(Input From RisaTower)
Shear Force =	$Shear := 8.6 \cdot kips$	(Input From RisaTower)
Axial Force =	$Axial := 4.2 \cdot kips$	(Input From RisaTower)

Anchor Bolt Data:

Use ASTM A325

Number of Anchor Bolts =	$N := 16$	(User Input)
Diameter of Bolt Circle =	$D_{bc} := 15.25 \cdot in$	(User Input)
Bolt Ultimate Strength =	$F_u := 120 \cdot ksi$	(User Input)
Bolt Yield Strength =	$F_y := 92 \cdot ksi$	(User Input)
Bolt Modulus =	$E := 29000 \cdot ksi$	(User Input)
Diameter of Flange Bolts =	$D := 0.75 \cdot in$	(User Input)
Threads per Inch =	$n := 10$	(User Input)

Base Plate Data:

Use ASTM A36

Plate Yield Strength =	$Fy_{bp} := 36 \cdot ksi$	(User Input)
Base Plate Thickness =	$t_{bp} := 0.75 \cdot in$	(User Input)
Base Plate Diameter =	$D_{bp} := 18 \cdot in$	(User Input)
Outer Pole Diameter =	$D_{pole} := 12.5 \cdot in$	(User Input)

Base Plate Data:

Weld Grade	E70XX	(User Input)
Weld Yield Stress =	$F_{yw} := 70 \cdot ksi$	(User Input)
Weld Size =	$sw := 0.5 \cdot in$	(User Input)

Geometric Layout Data:

Distance from Bolts to Centroid of Pole:

$d_1 := 7.625\text{in}$ (User Input)

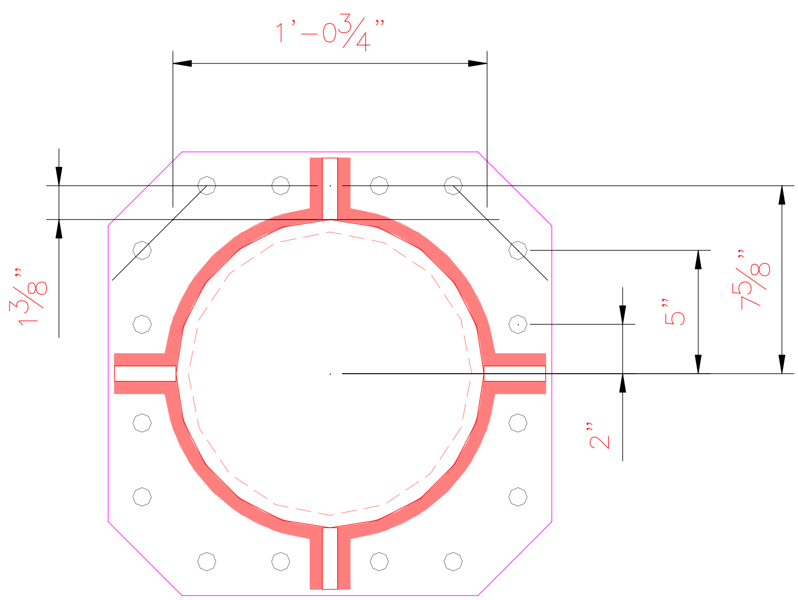
$d_2 := 5\text{in}$ (User Input)

$d_3 := 2\text{in}$ (User Input)

Critical Distances For Bending in Plate:

$ma_1 := 1.375\text{in}$ (User Input)

Effective Width of Baseplate for Bending = $B_{eff} := 12.75\text{in}$ (User Input)



ANCHOR BOLT AND PLATE GEOMETRY

Anchor Bolt Analysis:

Calculated Anchor Bolt Properties:

Polar Moment of Inertia = $I_p := \left[(d_1)^2 \cdot 8 + (d_2)^2 \cdot 4 + (d_3)^2 \cdot 4\right] = 581.125 \cdot in^2$

Gross Area of Bolt = $A_g := \frac{\pi}{4} \cdot D^2 = 0.442 \cdot in^2$

Net Area of Bolt = $A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n}\right)^2 = 0.334 \cdot in^2$

Net Diameter = $D_n := \frac{2 \cdot \sqrt{A_n}}{\sqrt{\pi}} = 0.653 \cdot in$

Radius of Gyration of Bolt = $r := \frac{D_n}{4} = 0.163 \cdot in$

Section Modulus of Bolt = $S_x := \frac{\pi \cdot D_n^{\ 3}}{32} = 0.027 \cdot in^3$

Check Anchor Bolt Tension Force:

Maximum Tensile Force = $T_{Max} := OM \cdot \frac{d_1}{I_p} - \frac{Axial}{N} = 11.7 \cdot kips$

Allowable Tensile Force = $T_{ALL} := \frac{(0.75 \cdot A_g \cdot F_u)}{2} = 19.9 \cdot kips$

Bolt Tension % of Capacity = $\frac{T_{Max}}{T_{ALL}} = 58.9 \cdot \%$

Condition1 = $Condition1 := if\left(\frac{T_{Max}}{T_{ALL}} \le 1.00, \text{"OK"}, \text{"Overstressed"}\right)$

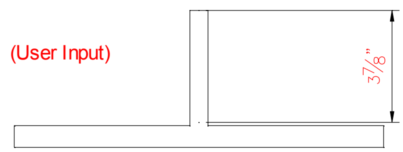
$Condition1 = \text{"OK"}$

Base Plate Analysis:

Force from Bolts = $C_1 := OM \cdot \frac{d_1}{I_p} + \frac{Axial}{N} = 12.2 \cdot kips$

Maximum Bending Moment in Plate = $M_{bp} := 4 \cdot C_1 \cdot ma_1 = 67.3 \cdot in \cdot kip$

Plate Section Modulus = $S_{bp} := \frac{14.9605 \cdot in^4}{3.875 \cdot in} = 3.9 \cdot in^3$ (User Input)



Maximum Bending Stress in Plate = $f_{bp} := \frac{M_{bp}}{S_{bp}} = 17.4 \cdot ksi$

Area: 12.0625 sq in

Principal moments about centroid: I: 14.9605 in^4
J: 129.6234 in^4

Allowable Bending Stress in Plate = $F_{bp} := 0.75 \cdot Fy_{bp} = 27 \cdot ksi$

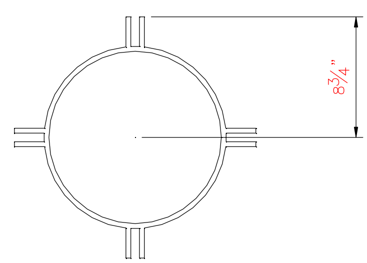
Plate Bending Stress % of Capacity = $\frac{f_{bp}}{F_{bp}} = 64.5 \cdot \%$

Condition3 = Condition2 := if$\left(\frac{f_{bp}}{F_{bp}} < 1.00, \text{"Ok"}, \text{"Overstressed"}\right)$

Condition2 = "Ok"

Antenna Mast to Base Plate Weld Check:

Allowable Weld Stress = $F_w := 0.3 \cdot F_{yw} = 21 \cdot ksi$



Weld Area = $A_w := 20.4 \cdot in^2$ (User Input)

Weld Moment of Inertia = $I_w := 477 \cdot in^4$ (User Input)

$c := 8.75 \cdot in$ (User Input)

Section Modulus of Weld = $S_w := \frac{I_w}{c} = 54.51 \cdot in^3$

Area: 20.3984 sq in

Principal moments about centroid: I: 476.9779 in^4
J: 476.9779 in^4

Weld Stress = $f_w := \frac{OM}{S_w} + \frac{Shear}{A_w} = 17.15 \cdot ksi$

Condition3 := if$\left(f_w < F_w, \text{"OK"}, \text{"Overstressed"}\right)$

Condition3 = "OK"

Mast Connection to CL&P Tower:

Check Angle to Tower Leg Conneciton:

Reactions:

Vertical y-dir = $Vertical := 6.5 \cdot kips$ (Input From Risa-3D LC #2)

Horizontal x-dir = $Horizontal_x := 3.8 \cdot kips$ (Input From Risa-3D LC #2)

Horizontal z-dir = $Horizontal_z := 3.4 \cdot kips$ (Input From Risa-3D LC #2)

Bolt Data:

Bolt Type = ASTM A325 (User Input)

Bolt Diameter = $D := 0.75 \cdot in$ (User Input)

Area of Bolt = $A_b := \frac{1}{4} \cdot \pi \cdot D^2 = 0.442 \cdot in^2$ (User Input)

Number of Bolts = $N_b := 6$ (User Input)

Nominal Tensile Stress = $F_{nt} := 90 \cdot ksi$ (User Input)

Nominal Shear Stress = $F_{nv} := 54 \cdot ksi$ (User Input)

Factor of Safety = $\Omega := 2.0$ (User Input)

Shear Stress = $f_{rv} := \frac{\sqrt{Horizontal_z^2 + Vertical^2}}{N_b \cdot A_b} = 2.8 \cdot ksi$

Allowable Shear Strength = $R_{nv} := \frac{F_{nv}}{\Omega} = 27 \cdot ksi$

Bolt Shear % of Capacity = $\frac{f_{rv}}{R_{nv}} = 10.25 \cdot \%$

Check Bolt Shear = $Bolt\_Shear := if\left(\frac{f_{rv}}{R_{nv}} \le 1.00, \text{"OK"}, \text{"Overstressed"}\right)$

$Bolt\_Shear = \text{"OK"}$

Modified Nominal Tensile Strength = $F'_{nt} := \left(1.3 \cdot F_{nt} - \frac{\Omega \cdot F_{nt}}{F_{nv}} \cdot f_{rv}\right) = 107.775 \cdot ksi$

Allowable Tensile Strength = $R_{nt} := \frac{F'_{nt}}{\Omega} = 53.888 \cdot ksi$

Tension Stress = $f_{rt} := \frac{Horizontal_x}{N_b \cdot A_b} = 1.4 \cdot ksi$

Bolt Tenison % of Capacity = $\frac{f_{rt}}{R_{nt}} = 2.66 \cdot \%$

Check Bolt Tension = $Bolt\_Tension := if\left(\frac{f_{rt}}{R_{nt}} \le 1.00, \text{"OK"}, \text{"Overstressed"}\right)$

$Bolt\_Tension = \text{"OK"}$

Basic Components

Heavy Wind Pressure =	$p := 4.00$	psf	(User Input NESC 2007 Figure 250-1 & Table 250-1)
Basic Windspeed =	$V := 110$	mph	(User Input NESC 2007 Figure 250-2(e))
Radial Ice Thickness =	$Ir := 0.50$	in	(User Input)
Radial Ice Density =	$Id := 56.0$	pcf	(User Input)

Factors for Extreme Wind Calculation

Elevation of Top of PCS Mast Above Grade = $TME := 90$ ft (User Input)

Multiplier Gust Response Factor = $m := 1.25$ (User Input - Only for NESC Extreme wind case)

NESC Factor = $kv := 1.43$ (User Input from NESC 2007 Table 250-3 equation)

Importance Factor = $I := 1.0$ (User Input from NESC 2007 Section 250.C.2)

Velocity Pressure Coefficient = $Kz := 2.01 \cdot \left(\frac{TME}{900}\right)^{\frac{2}{9.5}} = 1.238$ (NESC 2007 Table 250-2)

Exposure Factor = $Es := 0.346 \left[\frac{33}{(0.67 \cdot TME)}\right]^{\frac{1}{7}} = 0.317$ (NESC 2007 Table 250-3)

Response Term = $Bs := \frac{1}{\left(1 + 0.375 \cdot \frac{TME}{220}\right)} = 0.867$ (NESC 2007 Table 250-3)

Gust Response Factor = $Grf := \frac{\left[1 + \left(2.7 \cdot Es \cdot Bs^{\frac{1}{2}}\right)\right]}{kv^2} = 0.879$ (NESC 2007 Table 250-3)

Wind Pressure = $qz := 0.00256 \cdot Kz \cdot V^2 \cdot Grf \cdot I = 33.7$ psf (NESC 2007 Section 250.C.2)

Shape Factors

NUS Design Criteria Issued April 12, 2007

Shape Factor for Round Members =	$Cd_R := 1.3$	(User Input)
Shape Factor for Flat Members =	$Cd_F := 1.6$	(User Input)
Shape Factor for Coax Cables Attached to Outside of Pole =	$Cd_{coax} := 1.45$	(User Input)

Overload Factors

NU Design Criteria Table

Overload Factors for Wind Loads:

NESC Heavy Loading =	**2.5**	(User Input)	Apply in Risa-3D Analysis
NESC Extreme Loading =	**1.0**	(User Input)	Apply in Risa-3D Analysis

Overload Factors for Vertical Loads:

NESC Heavy Loading =	**1.5**	(User Input)	Apply in Risa-3D Analysis
NESC Extreme Loading =	**1.0**	(User Input)	Apply in Risa-3D Analysis

Development of Wind & Ice Load on PCS Mast

PCS Mast Data: (HSS12.5"x0.625")

Mast Shape =	Round		(User Input)
Mast Diameter =	$D_{mast} := 12.5$	in	(User Input)
Mast Length =	$L_{mast} := 13.5$	ft	(User Input)
Mast Thickness =	$t_{mast} := 0.625$	in	(User Input)

Wind Load (NESC Extreme)

Mast Projected Surface Area = $A_{mast} := \frac{D_{mast}}{12} = 1.042$ sf/ft

Total Mast Wind Force (Below NU Structure) = $qz \cdot Cd_R \cdot A_{mast} = 46$ plf **BLC 5**

Wind Load (NESE Heavy)

Mast Projected Surface Area w/ Ice = $AICE_{mast} := \frac{(D_{mast} + 2 \cdot Ir)}{12} = 1.125$ sf/ft

Total Mast Wind Force w/ Ice = $p \cdot Cd_R \cdot AICE_{mast} = 6$ plf **BLC 4**

Gravity Loads (without ice)

Weight of the mast = Self Weight **(Computed internally by Risa-3D)** plf **BLC 1**

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{mast} := \frac{\pi}{4}\left[(D_{mast} + Ir \cdot 2)^2 - D_{mast}^{\ 2}\right] = 20.4$ sq in

Weight of Ice on Mast = $W_{ICEmast} := Id \cdot \frac{Ai_{mast}}{144} = 8$ plf **BLC 3**

Development of Wind & Ice Load on Antennas

Antenna Data: (AT&T)

Antenna Model = CCI HPA-65R-BUU-H8

Antenna Shape = Flat (User Input)

Antenna Height = $L_{ant} := 92.4$ in (User Input)

Antenna Width = $W_{ant} := 14.8$ in (User Input)

Antenna Thickness = $T_{ant} := 7.4$ in (User Input)

Antenna Weight = $WT_{ant} := 78$ lbs (User Input)

Number of Antennas = $N_{ant} := 6$ (User Input)

Gravity Load (without ice)

Weight of All Antennas = $Wt_{ant1} := WT_{ant} \cdot N_{ant} = 468$ lbs **BLC 2**

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 10120$ cu in

Volume of Ice on Each Antenna = $V_{ice} := \left(L_{ant} + 2 \cdot Ir\right)\left(W_{ant} + 2 \cdot Ir\right)\left(T_{ant} + 2 \cdot Ir\right) - V_{ant} = 2276$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 74$ lbs

Weight of Ice on All Antennas = $Wt_{ice.ant1} := W_{ICEant} \cdot N_{ant} = 443$ lbs **BLC 3**

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{\left(L_{ant} + 2 \cdot Ir\right) \cdot \left(W_{ant} + 2 \cdot Ir\right)}{144} = 10.2$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 61.5$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant1} := p \cdot Cd_F \cdot A_{ICEant} = 394$ lbs **BLC 4**

Wind Load (NESC Extreme)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 9.5$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 57$ sf

Total Antenna Wind Force = $F_{ant1} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 3842$ lbs **BLC 5**

Development of Wind & Ice Load on Antennas

Antenna Data: (AT&T)

Antenna Model =	CCI OPA-65R-LCUU-H8		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 92.7$	in	(User Input)
Antenna Width =	$W_{ant} := 14.4$	in	(User Input)
Antenna Thickness =	$T_{ant} := 7.0$	in	(User Input)
Antenna Weight =	$WT_{ant} := 100$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 3$		(User Input)

Gravity Load (without ice)

Weight of All Antennas = $Wt_{ant1} := WT_{ant} \cdot N_{ant} = 300$ lbs **BLC 2**

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 9344$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot Ir)(W_{ant} + 2 \cdot Ir)(T_{ant} + 2 \cdot Ir) - V_{ant} = 2200$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 71$ lbs

Weight of Ice on All Antennas = $Wt_{ice.ant1} := W_{ICEant} \cdot N_{ant} = 214$ lbs **BLC 3**

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir)}{144} = 10$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 30.1$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant1} := p \cdot Cd_F \cdot A_{ICEant} = 192$ lbs **BLC 4**

Wind Load (NESC Extreme)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 9.3$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 27.8$ sf

Total Antenna Wind Force = $F_{ant1} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 1875$ lbs **BLC 5**

Development of Wind & Ice Load on TMA's

TMA Data: (AT&T)

TMA Model = CCI BPDB7823VG12A

TMA Shape = Flat (User Input)

TMA Height = $L_{TMA} := 14.25$ in (User Input)

TMA Width = $W_{TMA} := 11.03$ in (User Input)

TMA Thickness = $T_{TMA} := 4.11$ in (User Input)

TMA Weight = $WT_{TMA} := 30$ lbs (User Input)

Number of TMA's = $N_{TMA} := 18$ (User Input)

Gravity Load (without ice)

Weight of All TMA's = $Wt_{TMA1} := WT_{TMA} \cdot N_{TMA} = 540$ lbs **BLC 2**

Gravity Load (ice only)

Volume of Each TMA = $V_{TMA} := L_{TMA} \cdot W_{TMA} \cdot T_{TMA} = 646$ cu in

Volume of Ice on Each TMA = $V_{ice} := (L_{TMA} + 2 \cdot Ir)(W_{TMA} + 2 \cdot Ir)(T_{TMA} + 2 \cdot Ir) - V_{TMA} = 291$ cu in

Weight of Ice on Each TMA = $W_{ICETMA} := \frac{V_{ice}}{1728} \cdot Id = 9$ lbs

Weight of Ice on All TMA's = $Wt_{ice.TMA1} := W_{ICETMA} \cdot N_{TMA} = 170$ lbs **BLC 3**

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to all TMA's Simultaneously

Surface Area for One TMA w/ Ice = $SA_{ICETMA} := \frac{(L_{TMA} + 2 \cdot Ir) \cdot (W_{TMA} + 2 \cdot Ir)}{144} = 1.3$ sf

TMA Projected Surface Area w/ Ice = $A_{ICETMA} := SA_{ICETMA} \cdot N_{TMA} = 22.9$ sf

Total TMA Wind Force w/ Ice = $Fi_{TMA1} := p \cdot Cd_F \cdot A_{ICETMA} = 147$ lbs **BLC 4**

Wind Load (NESC Extreme)

Assumes Maximum Possible Wind Pressure Applied to all TMA's Simultaneously

Surface Area for One TMA = $SA_{TMA} := \frac{L_{TMA} \cdot W_{TMA}}{144} = 1.1$ sf

TMA Projected Surface Area = $A_{TMA} := SA_{TMA} \cdot N_{TMA} = 19.6$ sf

Total TMA Wind Force = $F_{TMA1} := qz \cdot Cd_F \cdot A_{TMA} \cdot m = 1325$ lbs **BLC 5**

Development of Wind & Ice Load on Antenna Mounts

Mount Data: (AT&T)

Mount Type: Site Pro Ultra Low Profile Monopole Mount ULP12

Mount Shape = Flat

Mount Projected Surface Area = $CdAa := 27$ sf (User Input)

Mount Projected Surface Area w/ Ice = $CdAa_{ice} := 33.8$ sf (User Input)

Mount Weight = $WT_{mnt} := 1405$ lbs (User Input)

Mount Weight w/ Ice = $WT_{mnt.ice} := 1760$ lbs (User Input)

Gravity Loads (without ice)

Weight of All Mounts = $Wt_{mnt1} := WT_{mnt} = 1405$ lbs **BLC 2**

Gravity Load (ice only)

Weight of Ice on All Mounts = $Wt_{ice.mnt1} := \left(WT_{mnt.ice} - WT_{mnt}\right) = 355$ lbs **BLC 3**

Wind Load (NESC Heavy)

Total Mount Wind Force w/ Ice = $Fi_{mnt1} := p \cdot CdAa_{ice} = 135$ lbs **BLC 4**

Wind Load (NESC Extreme)

Total Mount Wind Force = $F_{mnt1} := qz \cdot CdAa \cdot m = 1138$ lbs **BLC 5**

Development of Wind & Ice Load on Coax Cables

Coax Cable Data:

Coax Type = HELIAX 1-5/8"

Shape = Round (User Input)

Coax Outside Diameter = $D_{coax} := 1.98$ in (User Input)

Coax Cable Length = $L_{coax} := 10$ ft (User Input)

Weight of Coax per foot = $Wt_{coax} := 1.04$ plf (User Input)

Total Number of Coax = $N_{coax} := 36$ (User Input)

No. of Coax Projecting Outside Face of PCS Mast = $NP_{coax} := 8$ (User Input)

Gravity Loads (without ice)

Weight of all cables w/o ice = $WT_{coax} := Wt_{coax} \cdot N_{coax} = 37$ plf **BLC 2**

Gravity Load (ice only)

Ice Area per Linear Foot = $Ai_{coax} := \frac{\pi}{4}\left[\left(D_{coax} + 2 \cdot Ir\right)^2 - D_{coax}^{\ 2}\right] = 3.9$ sq in

Ice Weight All Coax per foot = $WTi_{coax} := N_{coax} \cdot Id \cdot \frac{Ai_{coax}}{144} = 55$ plf **BLC 3**

Wind Load (NESC Heavy)

Coax projected surface area w/ Ice = $AICE_{coax} := \frac{NP_{coax} \cdot \left(D_{coax} + 2 \cdot Ir\right)}{12} = 2$ sf/ft

Total Coax Wind Force w/ Ice = $Fi_{coax} := p \cdot Cd_{coax} \cdot AICE_{coax} = 12$ plf **BLC 4**

Wind Load (NESC Extreme)

Coax projected surface area = $A_{coax} := \frac{\left(NP_{coax} D_{coax}\right)}{12} = 1.3$ sf/ft

Total Coax Wind Force (Above NU Structure) = $F_{coax} := qz \cdot Cd_{coax} \cdot A_{coax} \cdot m = 81$ plf **BLC 5**

Development of Wind & Ice Load on Brace Member

Member Data: HSS6x6x3/8

Shape = Flat (User Input)

Width = $W_{mem} := 6$ in (User Input)

Length = $L_{mem} := 5.5$ ft (User Input)

Height = $H_{mem} := 6$ in (User Input)

Wind Load (NESC Extreme)

Member Projected Surface Area = $A_{mem} := \frac{W_{mem}}{12} = 0.5$ sf/f

Total Member Wind Force = $qz \cdot Cd_F \cdot A_{mem} = 27$ plf **BLC 5**

Wind Load (NESE Heavy)

Member Projected Surface Area w/ Ice = $AICE_{mem} := \frac{(W_{mem} + 2 \cdot Ir)}{12} = 0.583$ sf/f

Total Member Wind Force w/ Ice = $p \cdot Cd_F \cdot AICE_{mem} = 4$ plf **BLC 4**

Gravity Loads (without ice)

Weight of the Member = Self Weight **(Computed internally by Risa-3D)** plf **BLC 1**

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{mem} := (W_{mem} + 2 \cdot Ir) \cdot (H_{mem} + 2 \cdot Ir) - W_{mem} \cdot H_{mem} = 13$ sq in

Weight of Ice on Member = $W_{ICEmem} := Id \cdot \frac{Ai_{mem}}{144} = 5$ plf **BLC 3**

CENTEK engineering, INC.
Consulting Engineers
63-2 North Branford Road
Branford, CT 06405
Ph. 203-488-0580 / Fax. 203-488-8587

Subject: **Analysis of NESC Heavy Wind and NESC Extreme Wind for Obtaining Antenna Frame Reactions Applied to CL&P Structure Tabulated Load Cases**
Location: **Meriden, CT**

Date:1/2/14 Prepared by: T.J.L. Checked by: C.F.C. Job No. 13305.000

Load Case	Description
1	Self Weight (Antenna Frame)
2	Weight of Appurtenances
3	Weight of Ice Only on Antenna Frame
4	x-direction NESC Heavy Wind on Antenna Frame
5	x-direction NESC Extreme Wind on Antenna Frame

CENTEK engineering, INC. Consulting Engineers 63-2 North Branford Road Branford, CT 06405 Ph. 203-488-0580 / Fax. 203-488-8587	Subject: **Analysis of NESC Heavy Wind and NESC Extreme Wind for Obtaining Antenna Frame Reactions Applied to CL&P Structure Load Combinations Table** Location: **Meriden, CT** Date: 1/2/14 Prepared by: T.J.L. Checked by: C.F.C. Job No. 13305.000

Load Combination	Description	Envelope Soultion	Wind Factor	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	x-direction NESC Heavy Wind on Antenna Frame		1		1	1.5	2	1.5	3	1.5	4	2.5		
2	x-direction NESC Extreme Wind on Antenna Frame		1		1	1	2	1	5	1				

Footnotes:
(1) BLC = Basic Load Case

Global

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Increase Nailing Capacity for Wind?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automaticly Iterate Stiffness for Walls?	No
Maximum Iteration Number for Wall Stiffness	3
Gravity Acceleration (ft/sec^2)	32.2
Wall Mesh Size (in)	12
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 9th: ASD
RISAConnection Code	AISC 14th(360-10): ASD
Cold Formed Steel Code	AISI 1999: ASD
Wood Code	AF&PA NDS-97: ASD
Wood Temperature	< 100F
Concrete Code	ACI 318-02
Masonry Code	ACI 530-05: ASD
Aluminum Code	AA ADM1-05: ASD - Building

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	PCA Load Contour
Parme Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections?	Yes
Use Cracked Sections Slab?	Yes
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR_SET_ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8

Global, Continued

Seismic Code	UBC 1997
Seismic Base Elevation (ft)	Not Entered
Add Base Weight?	No
Ct Z	.035
Ct X	.035
T Z (sec)	Not Entered
T X (sec)	Not Entered
R Z	8.5
R X	8.5
Ca	.36
Cv	.54
Nv	1
Occupancy Category	4
Seismic Zone	3
Seismic Detailing Code	ASCE 7-05
Om Z	1
Om X	1
Rho Z	1
Rho X	1

Footing Overturning Safety Factor	1.5
Check Concrete Bearing	No
Footing Concrete Weight (k/ft^3)	0
Footing Concrete f'c (ksi)	3
Footing Concrete Ec (ksi)	4000
Lamda	1
Footing Steel fy (ksi)	60
Minimum Steel	0.0018
Maximum Steel	0.0075
Footing Top Bar	#3
Footing Top Bar Cover (in)	3.5
Footing Bottom Bar	#3
Footing Bottom Bar Cover (in)	3.5
Pedestal Bar	#3
Pedestal Bar Cover (in)	1.5
Pedestal Ties	#3

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1...	Density[k/ft^3]	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
2	A572 Gr.50	29000	11154	.3	.65	.49	50	1.1	58	1.2
3	A992	29000	11154	.3	.65	.49	50	1.1	58	1.2
4	A500 Gr.42	29000	11154	.3	.65	.49	42	1.3	58	1.1
5	A500 Gr.46	29000	11154	.3	.65	.49	46	1.2	58	1.1
6	A53 Gr. B	29000	11154	.3	.65	.49	35	1.5	58	1.2

Hot Rolled Steel Design Parameters

	Label	Shape	Leng...	Lbyy[ft]	Lbzz[ft]	Lcomp ...	Lcomp ...	Kyy	Kzz	Cm...	Cm...	Cb	y s...	z s...	Functi...
1	M1	Mast	13.25												Lateral
2	M2	Brace	18.5												Lateral
3	M3	Brace	18.5												Lateral
4	M4	Brace	18.5												Lateral
5	M5	Brace	18.5												Lateral
6	M6	Brace	5.5												Lateral
7	M7	Brace	5.5												Lateral
8	M8	Brace	5.5												Lateral
9	M9	Brace	5.5												Lateral
10	M10	Brace	5.5												Lateral
11	M11	Brace	5.5												Lateral
12	M12	Brace	5.5												Lateral
13	M13	Brace	5.5												Lateral
14	M14	Brace	5.5	Segment	Segment										Lateral
15	M15	Brace	5.5												Lateral
16	M16	Brace	5.5	Segment	Segment										Lateral
17	M17	Brace	5.5												Lateral
18	M18	Brace	5.5												Lateral
19	M19	Brace	5.5												Lateral
20	M20	Brace	1.5												Lateral
21	M21	Brace	1.5												Lateral
22	M24	Brace	.75												Lateral
23	M25	Brace	.75												Lateral
24	M26	Brace	.75												Lateral
25	M27	Brace	.75												Lateral
26	M28	Brace	.75												Lateral
27	M29	Brace	.75												Lateral
28	M30	Brace	.75												Lateral
29	M31	Brace	.75												Lateral

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Ru...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Mast	HSS12.5X0.625	Beam	Pipe	A53 Gr. B	Typical	21.8	387	387	774
2	Brace	HSS6x6x6	Beam	Tube	A500 Gr.46	Typical	7.58	39.5	39.5	64.6

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design R...
1	M1	N1	N2			Mast	Beam	Pipe	A53 Gr. B	Typical
2	M2	N3	N11			Brace	Beam	Tube	A500 Gr.46	Typical
3	M3	N4	N12			Brace	Beam	Tube	A500 Gr.46	Typical
4	M4	N5	N13			Brace	Beam	Tube	A500 Gr.46	Typical
5	M5	N6	N14			Brace	Beam	Tube	A500 Gr.46	Typical
6	M6	N3	N4			Brace	Beam	Tube	A500 Gr.46	Typical
7	M7	N4	N6			Brace	Beam	Tube	A500 Gr.46	Typical
8	M8	N6	N5			Brace	Beam	Tube	A500 Gr.46	Typical
9	M9	N5	N3			Brace	Beam	Tube	A500 Gr.46	Typical
10	M10	N7	N8			Brace	Beam	Tube	A500 Gr.46	Typical
11	M11	N8	N10			Brace	Beam	Tube	A500 Gr.46	Typical
12	M12	N10	N9			Brace	Beam	Tube	A500 Gr.46	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design R...
13	M13	N9	N7			Brace	Beam	Tube	A500 Gr.46	Typical
14	M14	N11	N12			Brace	Beam	Tube	A500 Gr.46	Typical
15	M15	N12	N14			Brace	Beam	Tube	A500 Gr.46	Typical
16	M16	N14	N13			Brace	Beam	Tube	A500 Gr.46	Typical
17	M17	N13	N11			Brace	Beam	Tube	A500 Gr.46	Typical
18	M18	N18	N16			Brace	Beam	Tube	A500 Gr.46	Typical
19	M19	N15	N17			Brace	Beam	Tube	A500 Gr.46	Typical
20	M20	N20	N22			Brace	Beam	Tube	A500 Gr.46	Typical
21	M21	N19	N21			Brace	Beam	Tube	A500 Gr.46	Typical
22	M22	N20	N21			RIGID	None	None	RIGID	Typical
23	M23	N19	N22			RIGID	None	None	RIGID	Typical
24	M24	N23	N27			Brace	Beam	Tube	A500 Gr.46	Typical
25	M25	N24	N28			Brace	Beam	Tube	A500 Gr.46	Typical
26	M26	N25	N29			Brace	Beam	Tube	A500 Gr.46	Typical
27	M27	N26	N30			Brace	Beam	Tube	A500 Gr.46	Typical
28	M28	N31	N35			Brace	Beam	Tube	A500 Gr.46	Typical
29	M29	N32	N36			Brace	Beam	Tube	A500 Gr.46	Typical
30	M30	N33	N37			Brace	Beam	Tube	A500 Gr.46	Typical
31	M31	N34	N38			Brace	Beam	Tube	A500 Gr.46	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
1	N1	0	18.5	0	0	
2	N2	0	31.75	0	0	
3	N3	2.75	0	2.75	0	
4	N4	2.75	0	-2.75	0	
5	N5	-2.75	0	2.75	0	
6	N6	-2.75	0	-2.75	0	
7	N7	2.75	11	2.75	0	
8	N8	2.75	11	-2.75	0	
9	N9	-2.75	11	2.75	0	
10	N10	-2.75	11	-2.75	0	
11	N11	2.75	18.5	2.75	0	
12	N12	2.75	18.5	-2.75	0	
13	N13	-2.75	18.5	2.75	0	
14	N14	-2.75	18.5	-2.75	0	
15	N15	2.75	18.5	.75	0	
16	N16	2.75	18.5	-.75	0	
17	N17	-2.75	18.5	.75	0	
18	N18	-2.75	18.5	-.75	0	
19	N19	.75	18.5	.75	0	
20	N20	-.75	18.5	.75	0	
21	N21	.75	18.5	-.75	0	
22	N22	-.75	18.5	-.75	0	
23	N23	2.75	0	1.833	0	
24	N24	2.75	0	-1.833	0	
25	N25	-2.75	0	1.833	0	
26	N26	-2.75	0	-1.833	0	
27	N27	2	0	1.833	0	
28	N28	2	0	-1.833	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
29	N29	-2	0	1.833	0	
30	N30	-2	0	-1.833	0	
31	N31	2.75	11	1.833	0	
32	N32	2.75	11	-1.833	0	
33	N33	-2.75	11	1.833	0	
34	N34	-2.75	11	-1.833	0	
35	N35	2	11	1.833	0	
36	N36	2	11	-1.833	0	
37	N37	-2	11	1.833	0	
38	N38	-2	11	-1.833	0	

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]	Footing
1	N1							
2	N7							
3	N9							
4	N8							
5	N10							
6	N3							
7	N4							
8	N5							
9	N6							
10	N31							
11	N32							
12	N33							
13	N34							
14	N35	Reaction	Reaction	Reaction				
15	N36	Reaction	Reaction	Reaction				
16	N37	Reaction	Reaction	Reaction				
17	N38	Reaction	Reaction	Reaction				
18	N23							
19	N24							
20	N25							
21	N26							
22	N27	Reaction	Reaction	Reaction				
23	N28	Reaction	Reaction	Reaction				
24	N29	Reaction	Reaction	Reaction				
25	N30	Reaction	Reaction	Reaction				

Member Point Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Y	-.468	9.25
2	M1	Y	-.3	9.25
3	M1	Y	-.54	9.25
4	M1	Y	-1.405	9.25

Member Point Loads (BLC 3 : Weight of Ice Only on Antenna Fr)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]

Member Point Loads (BLC 3 : Weight of Ice Only on Antenna Fr) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Y	-.443	9.25
2	M1	Y	-.214	9.25
3	M1	Y	-.17	9.25
4	M1	Y	-.355	9.25

Member Point Loads (BLC 4 : x-dir NESC Heavy Wind on Antenna)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	.394	9.25
2	M1	X	.192	9.25
3	M1	X	.147	9.25
4	M1	X	.135	9.25

Member Point Loads (BLC 5 : x-dir NESC Extreme Wind on Anten)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	3.842	9.25
2	M1	X	1.875	9.25
3	M1	X	1.325	9.25
4	M1	X	1.138	9.25

Joint Loads and Enforced Displacements

Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/f...
No Data to Print ...			

Member Distributed Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Start Magnitude[k/ft,F]	End Magnitude[k/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.037	-.037	0	0
2	M4	Y	-.019	-.019	11	18
3	M2	Y	-.019	-.019	11	18

Member Distributed Loads (BLC 3 : Weight of Ice Only on Antenna Fr)

	Member Label	Direction	Start Magnitude[k/ft,F]	End Magnitude[k/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.008	-.008	0	0
2	M1	Y	-.055	-.055	0	0
3	M4	Y	-.028	-.028	11	18
4	M2	Y	-.028	-.028	11	18
5	M9	Y	-.005	-.005	0	0
6	M8	Y	-.005	-.005	0	0
7	M7	Y	-.005	-.005	0	0
8	M6	Y	-.005	-.005	0	0
9	M2	Y	-.005	-.005	0	0
10	M3	Y	-.005	-.005	0	0
11	M4	Y	-.005	-.005	0	0
12	M5	Y	-.005	-.005	0	0
13	M13	Y	-.005	-.005	0	0
14	M12	Y	-.005	-.005	0	0
15	M11	Y	-.005	-.005	0	0
16	M10	Y	-.005	-.005	0	0

Member Distributed Loads (BLC 3 : Weight of Ice Only on Antenna Fr) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,F]	End Magnitude[k/ft,F]	Start Location[ft,%]	End Location[ft,%]
17	M15	Y	-.005	-.005	0	0
18	M16	Y	-.005	-.005	0	0
19	M17	Y	-.005	-.005	0	0
20	M14	Y	-.005	-.005	0	0
21	M18	Y	-.005	-.005	0	0
22	M19	Y	-.005	-.005	0	0
23	M21	Y	-.005	-.005	0	0
24	M20	Y	-.005	-.005	0	0

Member Distributed Loads (BLC 4 : x-dir NESC Heavy Wind on Antenna)

	Member Label	Direction	Start Magnitude[k/ft,F]	End Magnitude[k/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.006	.006	0	0
2	M1	X	.012	.012	0	0
3	M4	X	.006	.006	11	18
4	M2	X	.006	.006	11	18
5	M4	X	.004	.004	0	0
6	M5	X	.004	.004	0	0
7	M12	X	.004	.004	0	0
8	M16	X	.004	.004	0	0
9	M8	X	.004	.004	0	0

Member Distributed Loads (BLC 5 : x-dir NESC Extreme Wind on Anten)

	Member Label	Direction	Start Magnitude[k/ft,F]	End Magnitude[k/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.046	.046	0	0
2	M1	X	.081	.081	0	0
3	M4	X	.04	.04	11	18
4	M2	X	.04	.04	11	18
5	M4	X	.027	.027	0	0
6	M5	X	.027	.027	0	0
7	M16	X	.027	.027	0	0
8	M12	X	.027	.027	0	0
9	M8	X	.027	.027	0	0

Basic Load Cases

	BLC Description	Category	X Gra...	Y Gra...	Z Grav...	Joint	Point	Distrib...	Area(...	Surfac...
1	Self Weight (Antenna Frame)	None		-1						
2	Weight of Appurtenances	None					4	3		
3	Weight of Ice Only on Antenna Fr	None					4	24		
4	x-dir NESC Heavy Wind on Ante...	None					4	9		
5	x-dir NESC Extreme Wind on An...	None					4	9		

Load Combinations

	Description	Solve	PDelta	SRSS	B...	Fa...	BLC	Fa...	BLC	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	x-dir NESC Heavy Wind on An...	Yes			1	1.5	2	1.5	3	1.5	4	2.5								
2	x-dir NESC Extreme Wind on ...	Yes			1	1	2	1	5	1										
3	Self Weight				1	1														

Envelope Joint Reactions

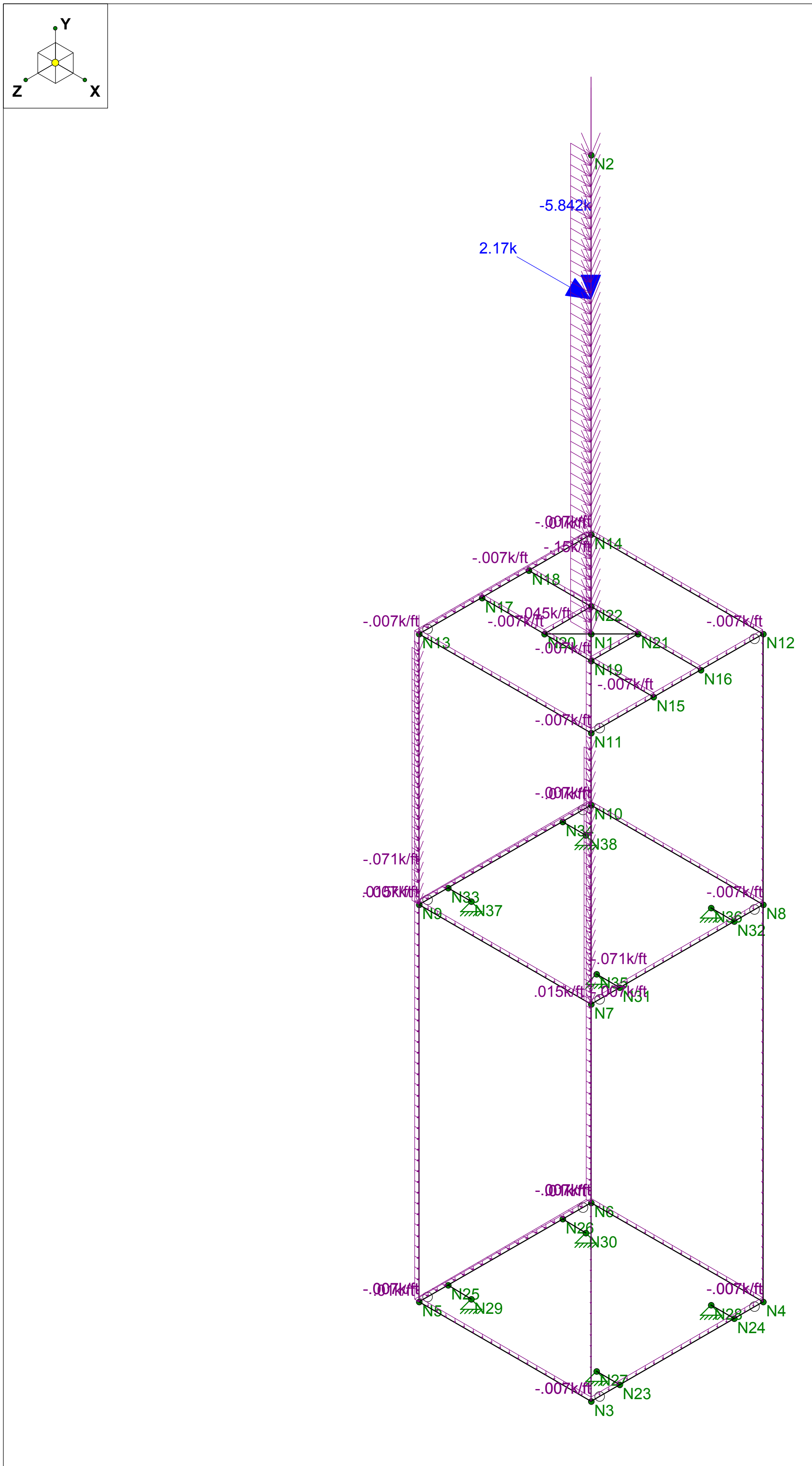
	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N35	max	-1.279	1	7.256	2	-1.085	1	0	1	0	1	0	1
2		min	-4.333	2	4.236	1	-3.732	2	0	1	0	1	0	1
3	N36	max	-1.139	1	7.136	2	3.805	2	0	1	0	1	0	1
4		min	-3.961	2	3.831	1	1.112	1	0	1	0	1	0	1
5	N37	max	-1.288	1	.825	1	3.729	2	0	1	0	1	0	1
6		min	-4.425	2	-4.929	2	1.062	1	0	1	0	1	0	1
7	N38	max	-1.15	1	.429	1	-1.089	1	0	1	0	1	0	1
8		min	-4.053	2	-5.025	2	-3.802	2	0	1	0	1	0	1
9	N27	max	1.292	2	8.359	2	1.159	2	0	1	0	1	0	1
10		min	.374	1	4.298	1	.333	1	0	1	0	1	0	1
11	N28	max	1.266	2	8.17	2	-.335	1	0	1	0	1	0	1
12		min	.362	1	3.921	1	-1.165	2	0	1	0	1	0	1
13	N29	max	1.186	2	.2	1	-.308	1	0	1	0	1	0	1
14		min	.308	1	-6.196	2	-1.15	2	0	1	0	1	0	1
15	N30	max	1.161	2	-.104	1	1.155	2	0	1	0	1	0	1
16		min	.301	1	-6.191	2	.31	1	0	1	0	1	0	1
17	Totals:	max	-3.511	1	17.637	1	0	2						
18		min	-11.867	2	8.579	2	0	1						

Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	1	N35	-1.279	4.236	-1.085	0	0	0
2	1	N36	-1.139	3.831	1.112	0	0	0
3	1	N37	-1.288	.825	1.062	0	0	0
4	1	N38	-1.15	.429	-1.089	0	0	0
5	1	N27	.374	4.298	.333	0	0	0
6	1	N28	.362	3.921	-.335	0	0	0
7	1	N29	.308	.2	-.308	0	0	0
8	1	N30	.301	-.104	.31	0	0	0
9	1	Totals:	-3.511	17.637	0			
10	1	COG (ft):	X: 0	Y: 19.179	Z: .154			

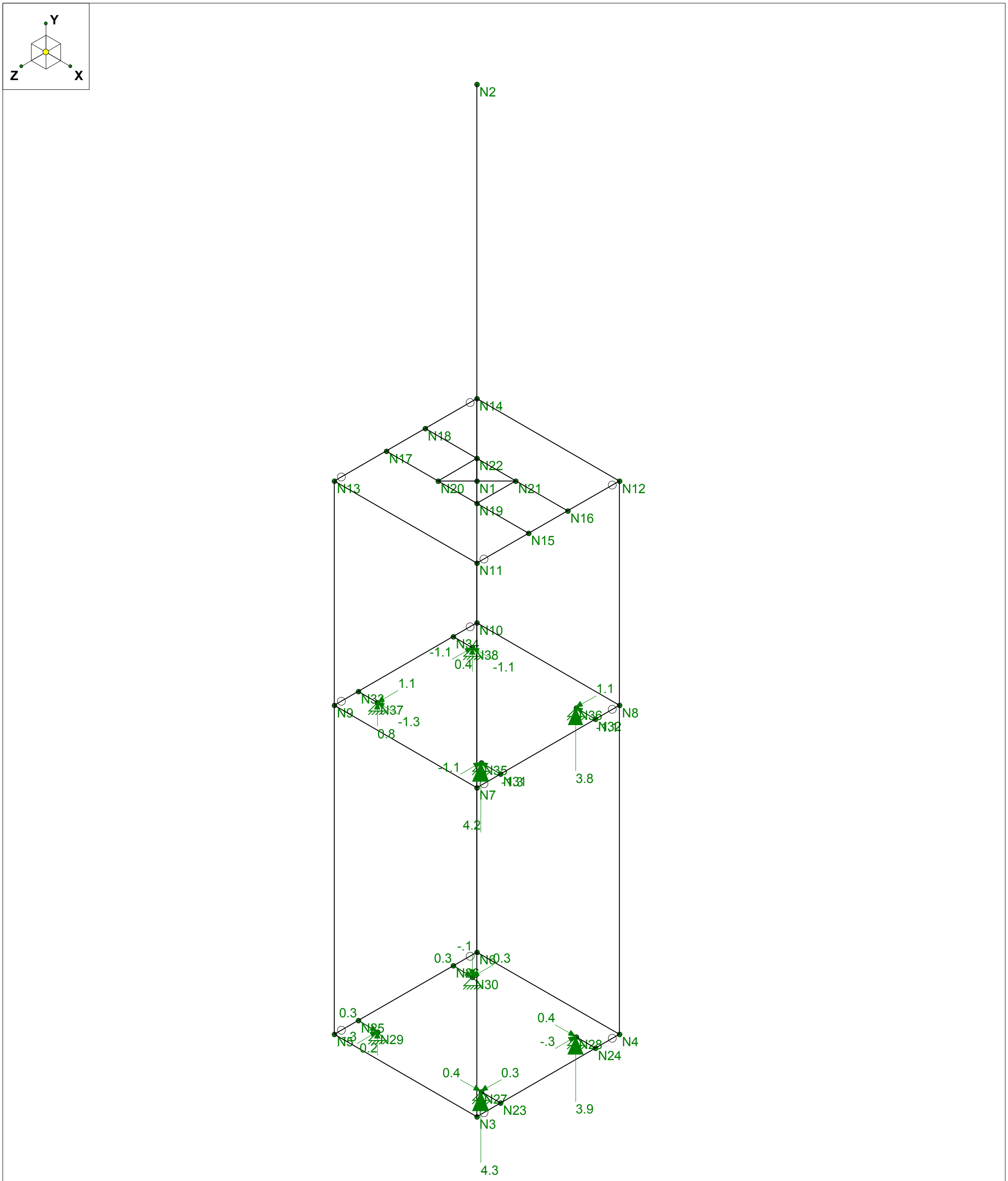
Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	2	N35	-4.333	7.256	-3.732	0	0	0
2	2	N36	-3.961	7.136	3.805	0	0	0
3	2	N37	-4.425	-4.929	3.729	0	0	0
4	2	N38	-4.053	-5.025	-3.802	0	0	0
5	2	N27	1.292	8.359	1.159	0	0	0
6	2	N28	1.266	8.17	-1.165	0	0	0
7	2	N29	1.186	-6.196	-1.15	0	0	0
8	2	N30	1.161	-6.191	1.155	0	0	0
9	2	Totals:	-11.867	8.579	0			
10	2	COG (ft):	X: 0	Y: 18.427	Z: .085			

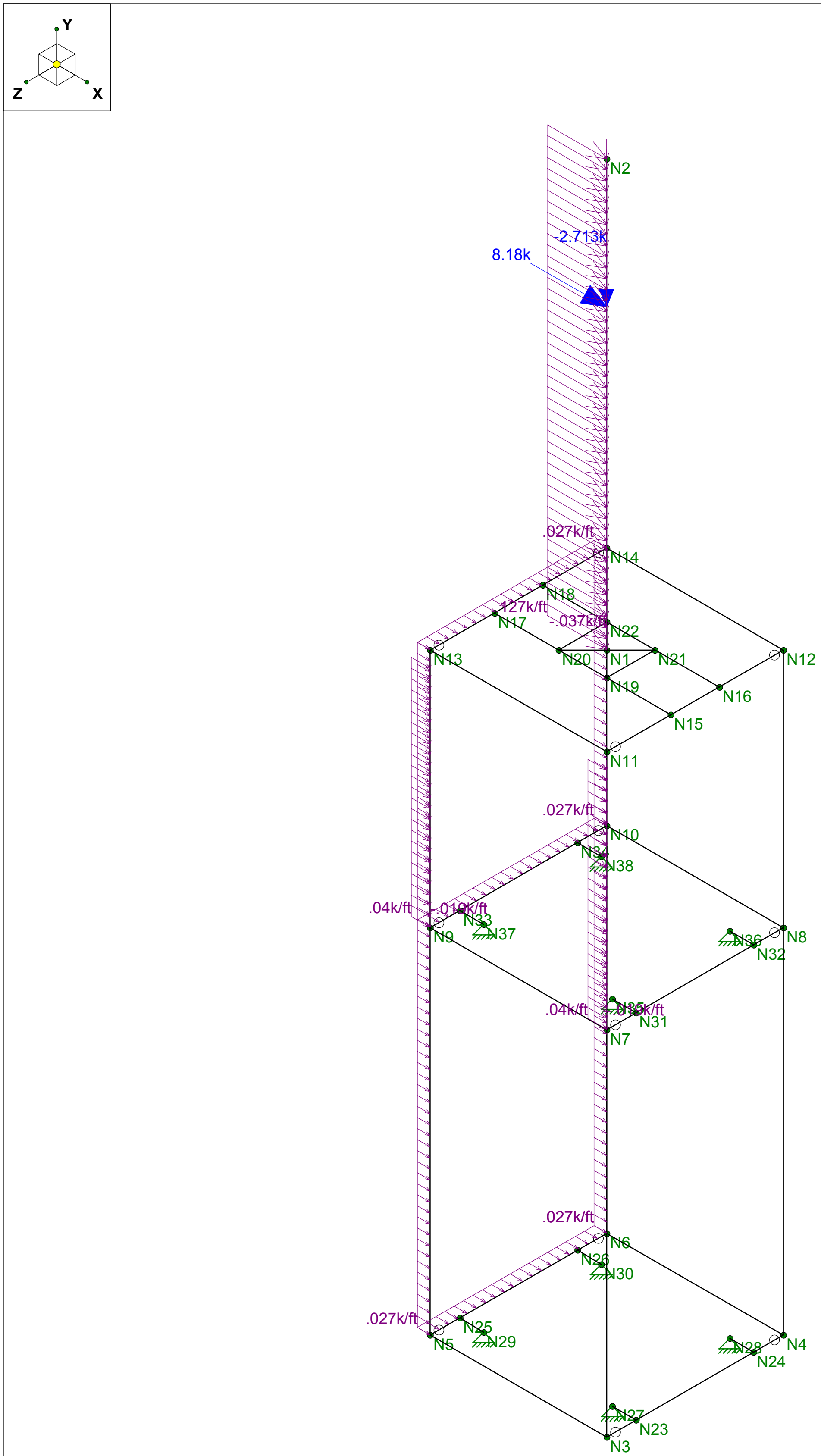


Loads: LC 1, x-dir NESC Heavy Wind on Antenna Frame

CENTEK Engineering, Inc.		
tjl, cfc	CL&P # 783 - Mast	Oct 6, 2014 at 10:14 AM
13305 / AT&T CT2117	LC #1 Loads	NESC.r3d

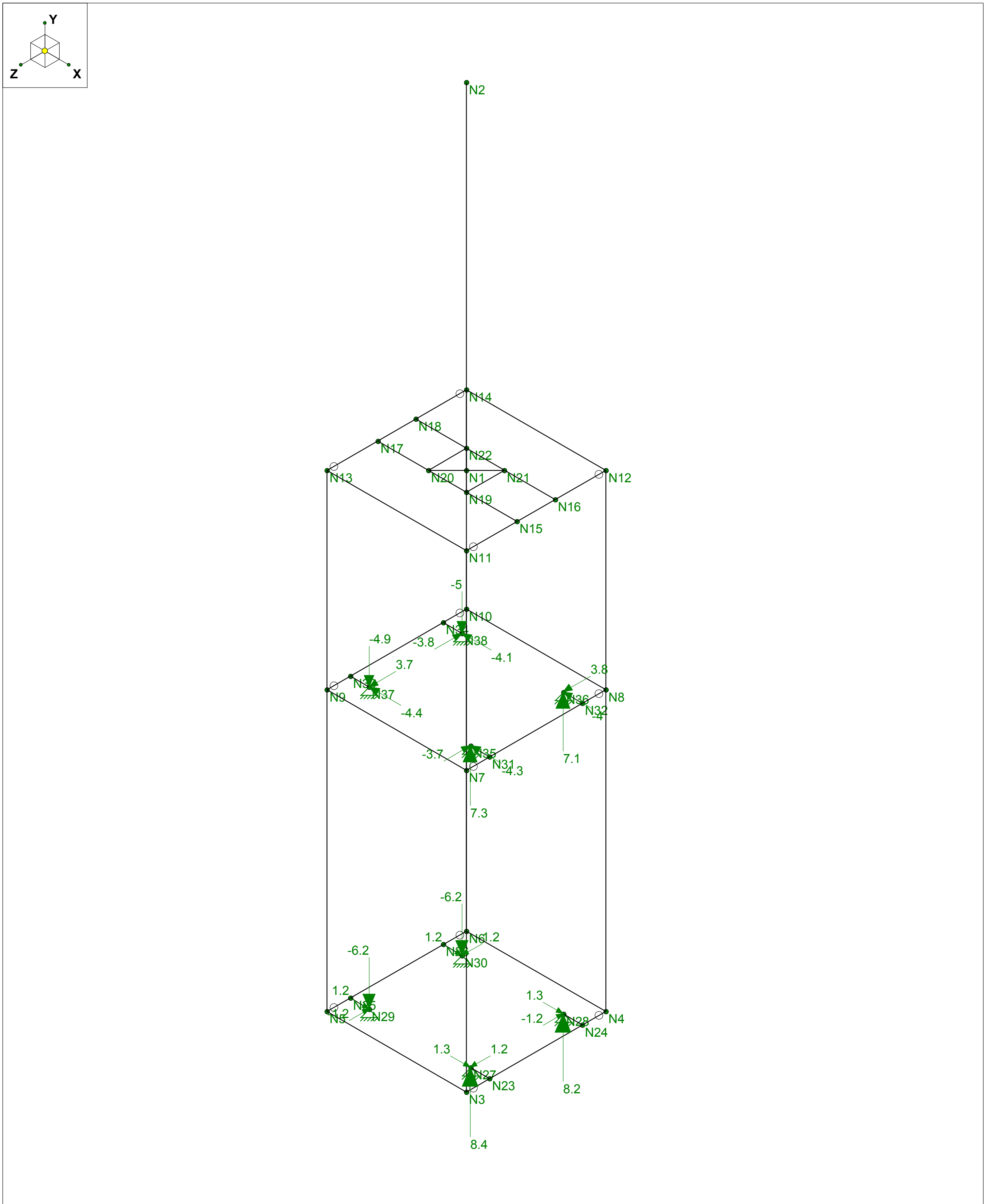


CENTEK Engineering, Inc.		
tjl, cfc	CL&P # 783 - Mast	Oct 6, 2014 at 10:15 AM
13305 / AT&T CT2117	LC #1 Reactions	NESC.r3d



Loads: LC 2, x-dir NESC Extreme Wind on Antenna Frame

CENTEK Engineering, Inc.		
tjl, cfc	CL&P # 783 - Mast	Oct 6, 2014 at 10:14 AM
13305 / AT&T CT2117	LC #2 Loads	NESC.r3d



CENTEK Engineering, Inc.		
tjl, cfc	CL&P # 783 - Mast	Oct 6, 2014 at 10:16 AM
13305 / AT&T CT2117	LC #2 Reactions	NESC.r3d

Coax Cable on CL&P Tower

Distance Between Coax Cable Attach Points =

Coax Cable Span = $Coax_{Span} := \begin{pmatrix} 8.25 \\ 7.375 \\ 8.125 \\ 7.25 \\ 9.5 \\ 13.25 \\ 24.25 \end{pmatrix} \cdot ft$ *(User Input)*

Diameter of Coax Cable = $D_{coax} := 1.98 \cdot in$ *(User Input)*

Weight of Coax Cable = $W_{coax} := 1.04 \cdot plf$ *(User Input)*

Number of Coax Cables = $N_{coax} := 18$ *(User Input)* (Typ. of Two Legs)

Number of Projected Coax Cables Transverse = $NP_{Tcoax} := 9$ *(User Input)*

Extreme Wind Pressure = $qz := 33.8 \cdot psf$ *(User Input)*

Heavy Wind Pressure = $p := 4 \cdot psf$ *(User Input)*

Radial Ice Thickness = $Ir := 0.5 \cdot in$ *(User Input)*

Radial Ice Density = $Id := 56 \cdot pcf$ *(User Input)*

Shape Factor = $Cd_{coax} := 1.6$ *(User Input)*

Overload Factor for NESC Heavy Wind Load = $OF_{HW} := 2.5$ *(User Input)*

Overload Factor for NESC Extreme Wind Load = $OF_{EW} := 1.0$ *(User Input)*

Overload Factor for NESC Heavy Vertical Load = $OF_{HV} := 1.5$ *(User Input)*

Overload Factor for NESC Extreme Vertical Load = $OF_{EV} := 1.0$ *(User Input)*

Wind Area with Ice Transverse = $A_{Tice} := \left(NP_{Tcoax} \cdot D_{coax} + 2 \cdot Ir\right) = 18.82 \cdot in$

Wind Area without Ice Transverse = $A_T := \left(NP_{Tcoax} \cdot D_{coax}\right) = 17.82 \cdot in$

Ice Area per Liner Ft = $Ai_{coax} := \frac{\pi}{4} \cdot \left[\left(D_{coax} + 2 \cdot Ir\right)^2 - D_{coax}^{\ 2}\right] = 0.027 \, ft^2$

Weight of Ice on All Coax Cables = $W_{ice} := Ai_{coax} \cdot Id \cdot N_{coax} = 27.269 \cdot plf$

Heavy Vertical Load =

$$Heavy_{Vert} := \overrightarrow{\left[\left(N_{coax} \cdot W_{coax} + W_{ice}\right) \cdot Coax_{Span} \cdot OF_{HV}\right]}$$

Heavy Transverse Load =

$$Heavy_{Trans} := \overrightarrow{\left(p \cdot A_{Tice} \cdot Cd_{coax} \cdot Coax_{Span} \cdot OF_{HW}\right)}$$

$$Heavy_{Vert} = \begin{pmatrix} 569 \\ 509 \\ 560 \\ 500 \\ 655 \\ 914 \\ 1673 \end{pmatrix} lb \qquad Heavy_{Trans} = \begin{pmatrix} 207 \\ 185 \\ 204 \\ 182 \\ 238 \\ 332 \\ 609 \end{pmatrix} lb$$

Extreme Vertical Load =

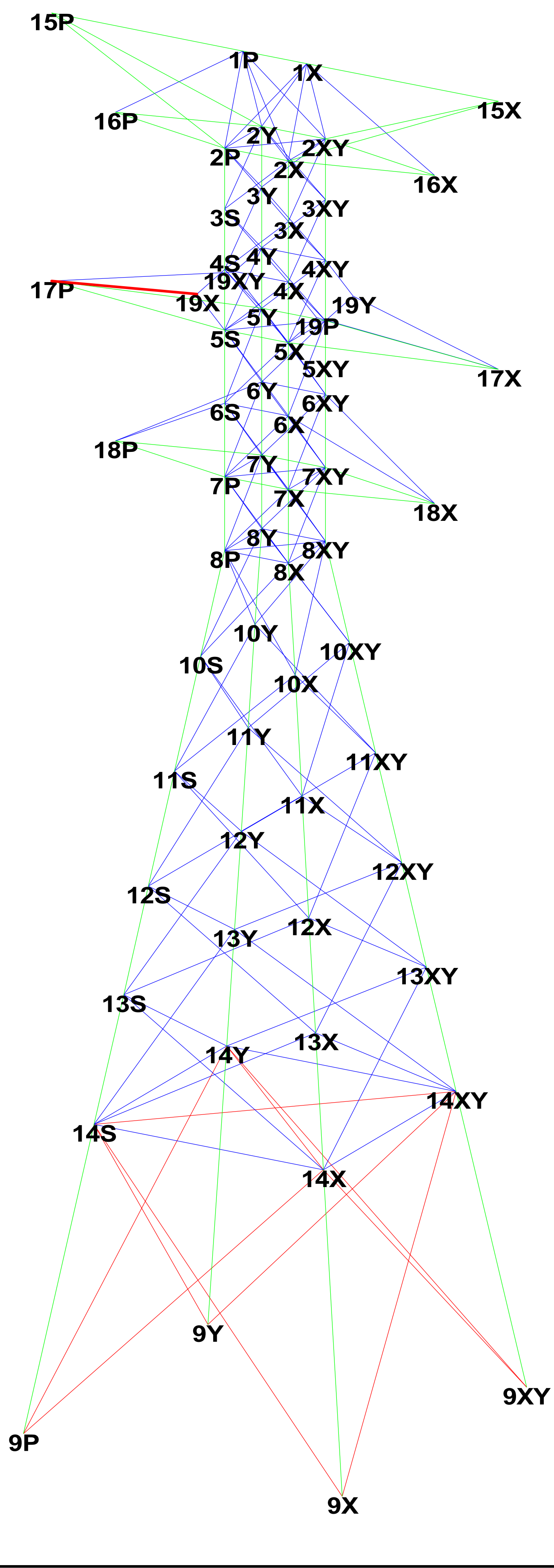
$$Extreme_{Vert} := \overrightarrow{\left[\left(N_{coax} \cdot W_{coax}\right) \cdot Coax_{Span} \cdot OF_{EV}\right]}$$

Extreme Transverse Load =

$$Extreme_{Trans} := \overrightarrow{\left[\left(qz \cdot A_{T} \cdot Cd_{coax}\right) \cdot Coax_{Span} \cdot OF_{EW}\right]}$$

$$Extreme_{Vert} = \begin{pmatrix} 154 \\ 138 \\ 152 \\ 136 \\ 178 \\ 248 \\ 454 \end{pmatrix} lb \qquad Extreme_{Trans} = \begin{pmatrix} 663 \\ 592 \\ 653 \\ 582 \\ 763 \\ 1064 \\ 1947 \end{pmatrix} lb$$

Centek Engineering Inc, Project: "pls tower - reinforced"
Tower Version 12.50, 10:21:10 AM Monday, October 06, 2014
Undeformed geometry displayed



Project Name : 13305.000 - Meriden, CT
Project Notes: CL&P Structure # 783/ AT&T CT2117
Project File : J:\Jobs\1330500.WI\04_Structural\Backup Documentation\Calcs\Rev (4)\PLS Tower\pls tower - reinforced.tow
Date run : 10:20:30 AM Monday, October 06, 2014
by : Tower Version 12.50
Licensed to : Centek Engineering Inc

Successfully performed nonlinear analysis

Member "Leg6P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "Leg6X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "Leg6XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "Leg6Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "Leg11P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "Leg11X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "Leg11XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "Leg11Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "Leg13P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "Leg13X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "Leg13XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "Leg13Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "XBrace8P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "XBrace8X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "XBrace8XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "XBrace8Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "XBrace9P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "XBrace9X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "XBrace9XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "XBrace9Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "XBrace10P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "XBrace10X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "XBrace10XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "XBrace10Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "XBrace11P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end,

edge and spacing distances will be checked. ??
Member "XBrace11X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "XBrace11XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "XBrace11Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "XBrace12P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "XBrace12X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "XBrace12XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "XBrace12Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "XBrace13P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "XBrace13X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "XBrace13XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "XBrace13Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "Arm5P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "Arm5X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "Arm5XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "Arm5Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "Arm6P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "Arm6Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "Diagonal 1P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "Diagonal 1X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "Diagonal 1XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "Diagonal 1Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
The model has 46 warnings. ??

Member check option: ASCE 10
Connection rupture check: ASCE 10
Crossing diagonal check: ASCE 10 [Alternate Unsupported RLOUT = 1]
Included angle check: None
Climbing load check: None
Redundant members checked with: Actual Force

Loads from file: j:\jobs\1330500.wi\04_structural\backup documentation\calcs\rev (4)\pls tower\meriden.lca

*** Analysis Results:

Maximum element usage is 96.54% for Angle "Leg13X" in load case "NESC Extreme"
Maximum insulator usage is 19.60% for Clamp "Clamp16" in load case "NESC Extreme"

Summary of Joint Support Reactions For All Load Cases:

Load Case	Joint Label	Long. Force (kips)	Tran. Force (kips)	Vert. Force (kips)	Shear Force (kips)	Tran. Moment (ft-k)	Long. Moment (ft-k)	Bending Moment (ft-k)	Vert. Moment (ft-k)	Found. Usage %
NESC Heavy	9P	2.66	-3.11	12.31	4.09	0.21	0.01	0.21	0.01	0.00
NESC Heavy	9X	-6.04	-6.68	-42.09	9.01	0.14	0.30	0.33	0.05	0.00
NESC Heavy	9XY	6.16	-5.84	-38.72	8.49	-0.08	0.19	0.21	0.04	0.00
NESC Heavy	9Y	-2.78	-2.44	13.88	3.70	-0.05	0.01	0.05	0.01	0.00
NESC Extreme	9P	11.50	-12.94	57.37	17.32	0.44	-0.02	0.44	0.02	0.00
NESC Extreme	9X	-9.88	-11.02	-67.62	14.80	0.34	0.47	0.58	0.08	0.00
NESC Extreme	9XY	9.95	-9.34	-62.43	13.65	-0.07	0.31	0.32	0.06	0.00
NESC Extreme	9Y	-11.69	-9.23	55.75	14.89	-0.05	-0.01	0.05	0.01	0.00

Summary of Joint Support Reactions For All Load Cases in Direction of Leg:

Load Case	Support Joint	Origin Joint	Member	Leg Force In Leg Dir. (kips)	Residual Shear Perpendicular To Leg (kips)	Residual Shear Horizontal To Leg - Res. (kips)	Residual Shear Horizontal To Leg - Long. (kips)	Residual Shear Horizontal To Leg - Tran. (kips)	Total Long. Force (kips)	Total Tran. Force (kips)	Total Vert. Force (kips)
NESC Heavy	9P	14S	Leg13P	-12.903	1.305	1.336	-0.693	1.142	2.66	-3.11	12.31
NESC Heavy	9X	14X	Leg13X	43.033	0.686	0.696	-0.694	-0.052	-6.04	-6.68	-42.09
NESC Heavy	9XY	14XY	Leg13XY	39.643	0.348	0.353	0.037	-0.351	6.16	-5.84	-38.72
NESC Heavy	9Y	14Y	Leg13Y	-14.356	0.589	0.602	0.560	0.221	-2.78	-2.44	13.88
NESC Extreme	9P	14S	Leg13P	-59.772	4.322	4.425	-2.326	3.765	11.50	-12.94	57.37
NESC Extreme	9X	14X	Leg13X	69.218	0.953	0.960	-0.939	0.197	-9.88	-11.02	-67.62
NESC Extreme	9XY	14XY	Leg13XY	63.899	0.644	0.653	0.037	-0.652	9.95	-9.34	-62.43
NESC Extreme	9Y	14Y	Leg13Y	-57.640	2.743	2.784	2.768	0.306	-11.69	-9.23	55.75

Overturning Moment Summary For All Load Cases:

Load Case	Transverse Moment (ft-k)	Longitudinal Moment (ft-k)	Resultant Moment (ft-k)
NESC Heavy	1069.982	49.393	1071.122
NESC Extreme	2431.749	35.758	2432.012

Sections Information:

Section Label	Top Z (ft)	Bottom Z (ft)	Joint Count	Member Count	Tran. Face Top Width (ft)	Tran. Face Bot Width (ft)	Tran. Face Gross Area (ft^2)	Long. Face Top Width (ft)	Long. Face Bot Width (ft)	Long. Face Gross Area (ft^2)
1	78.250	50.000	42	145	0.00	4.00	103.000	28.00	4.00	274.125
2	50.000	0.000	28	78	4.00	20.00	600.000	4.00	20.00	600.000

*** Overall summary for all load cases - Usage = Maximum Stress / Allowable Stress
Printed capacities do not include the strength factor entered for each load case.
The Group Summary reports on the member and load case that resulted in maximum usage
which may not necessarily be the same as that which produces maximum force.

Group Summary (Compression Portion):

Group	Group Angle	Angle	Steel	Max Usage	Max	Comp.	Comp.	Comp.	L/R	Comp.	Comp.	RLX	RLY	RLZ

Label	Desc.	Type	Size	Strength (ksi)	Usage %	Control	Use In Comp. %	Control Member	Force (kips)	Control Load Case	Capacity (kips)	Connect. Shear Capacity (kips)	Connect. Bearing Capacity (kips)				L/R Comp.	KL/R Comp.	Length Comp. (ft)	Curve No.	No. Of Bolts
Leg1	Leg1	SAU	2.5X2X0.1875	33.0	14.86	Comp	14.86	Leg1XY	-1.504	NESC Hea	10.122	18.200	21.094	1.000	1.000	1.000	151.34	151.34	5.385	4	2
Leg2	Leg2	SAE	4X4X0.3125	33.0	96.10	Tens	92.23	Leg6X	-64.295	NESC Ext	69.710	109.200	105.469	1.000	1.000	1.000	64.48	64.48	4.250	1	6
Leg3	Leg3	SAE	4X4X0.4375	33.0	96.12	Comp	96.12	Leg9X	-73.586	NESC Ext	76.554	0.000	0.000	1.000	1.000	1.000	101.88	101.88	6.664	1	0
Leg4	Leg4	SAE	5X5X0.375	33.0	96.54	Comp	96.54	Leg13X	-70.281	NESC Ext	78.526	72.800	168.750	0.500	0.500	0.500	108.74	108.74	17.942	1	8
XBrace1	XBrace1	SAE	1.75X1.75X0.1875	33.0	55.44	Tens	52.82	XBrace2P	-7.708	NESC Ext	14.594	18.200	21.094	0.750	0.500	0.500	92.98	99.73	5.315	2	2
XBrace2	XBrace2	SAU	3X2X0.25	33.0	44.57	Tens	36.05	XBrace10P	-9.842	NESC Ext	28.258	27.300	42.187	0.500	0.750	0.500	91.51	98.63	5.836	2	3
XBrace3	XBrace3	SAE	2.5X2.5X0.25	33.0	65.18	Comp	65.18	XBrace13P	-11.862	NESC Ext	26.663	18.200	28.125	1.000	0.500	0.500	91.07	105.54	5.836	3	2
XBrace4	XBrace4	SAE	2X2X0.25	33.0	54.78	Comp	54.78	XBrace14Y	-8.045	NESC Ext	14.684	18.200	28.125	0.791	0.582	0.582	140.10	135.36	7.844	5	2
XBrace5	XBrace5	SAE	2X2X0.1875	33.0	62.79	Cross	62.79	XBrace19P	-2.697	NESC Ext	4.296	9.100	10.547	1.000	0.559	0.559	217.49	217.49	11.183	4	1
XBrace6	XBrace6	SAE	2.5X2.5X0.1875	33.0	23.73	Tens	20.85	XBrace20XY	-1.897	NESC Ext	9.190	9.100	10.547	0.772	0.544	0.544	167.61	167.61	12.709	4	1
XBrace7	XBrace7	SAE	3X3X0.25	33.0	19.27	Comp	19.27	XBrace23P	-1.754	NESC Ext	10.760	9.100	14.062	1.000	0.543	0.543	195.71	195.71	15.168	4	1
XBrace8	XBrace8	SAU	2X1.5X0.1875	33.0	39.51	Tens	0.00	XBrace25XY	0.000		0.945	18.200	21.094	0.577	0.788	0.577	531.06	433.27	24.697	5	2
Horz1	Horizontal 1	SAE	2X2X0.1875	33.0	59.13	Tens	41.92	Horz1X	-3.814	NESC Ext	13.406	9.100	10.547	1.000	1.000	1.000	121.83	121.83	4.000	4	1
Horz2	Horizontal 2	SAU	3X2.5X0.25	33.0	47.17	Comp	47.17	Horz7X	-4.292	NESC Ext	11.214	9.100	14.062	1.000	0.500	0.500	182.86	182.86	14.400	4	1
Diag1	Diagonal 1	SAU	3.5X2.5X0.25	33.0	8.61	Comp	8.61	Diagonal 1X	-1.685	NESC Hea	19.584	27.300	42.187	1.000	0.500	0.500	145.07	145.07	13.153	4	3
Diag2	Diagonal 2	Bar	2x3/16	33.0	71.53	Tens	0.00	Diagonal 8Y	0.000		11.400	9.100	10.547	1.000	1.000	1.000	29.70	52.27	2.475	2	1
Diag3	Diagonal 3	Bar	2x1/4	33.0	31.12	Tens	0.00	Diagonal 6Y	0.000		14.428	9.100	14.062	1.000	1.000	1.000	48.00	66.00	4.000	2	1
Arm1	Arm1	DAL	2.5X2X0.1875	33.0	70.01	Tens	0.00	Arm2P	0.000		40.905	9.100	21.094	1.000	1.000	1.000	60.53	90.26	4.000	3	1
Arm2	Arm2	SAE	2.5X2.5X0.25	33.0	24.71	Comp	24.71	Arm4Y	-2.248	NESC Hea	25.851	9.100	14.062	1.000	1.000	1.000	97.76	108.88	4.000	3	1
Arm3	**Arm3**	**SAU**	**3.5X2.5X0.25**	**33.0**	**30.89**	**Comp**	**30.89**	**Arm5P**	**-5.623**	**NESC Hea**	**24.070**	**18.200**	**28.125**	**1.000**	**0.500**	**0.500**	**134.18**	**130.84**	**12.166**	**5**	**2**

A potentially damaging moment exists in the following members (make sure your system is well triangulated to minimize moments): Arm5P Arm5X Arm5XY Arm5Y ??

Label	Desc.	Type	Size	Strength (ksi)	Usage %	Control	Use In Comp. %	Control Member	Force (kips)	Control Load Case	Capacity (kips)	Connect. Shear Capacity (kips)	Connect. Bearing Capacity (kips)				L/R Comp.	KL/R Comp.	Length Comp. (ft)	Curve No.	No. Of Bolts
Inner1	Inner1	SAE	1.75X1.75X0.1875	33.0	8.15	Tens	7.51	g63P	-0.684	NESC Ext	13.392	9.100	10.547	0.750	0.500	0.500	98.95	109.48	5.657	3	1
Inner2	Inner1	SAU	2X1.5X0.1875	33.0	35.29	Comp	35.29	g64P	-0.361	NESC Hea	1.023	9.100	10.547	0.500	0.750	0.500	416.55	416.55	20.365	4	1
XBrace1R	XBrace1R	SAE	2X2X0.3125	36.0	47.17	Comp	47.17	XBrace6P	-8.584	NESC Ext	30.542	18.200	33.984	0.750	0.500	0.500	81.77	91.33	5.315	2	2
Horz3	Horizontal 3	SAE	2X2X0.25	33.0	89.45	Tens	81.28	Horz3X	-7.397	NESC Ext	17.545	9.100	14.062	1.000	1.000	1.000					

122.76 122.76 4.000 4 1

Group Summary (Tension Portion):

Group Label	Group Desc.	Angle Type	Angle Size	Steel Strength (ksi)	Max Usage %	Usage Control	Max Use In Tens. %	Tension Control Member	Tension Force (kips)	Tension Control Load Case	Net Section Capacity (kips)	Tension Connect. Shear Capacity (kips)	Tension Connect. Bearing Capacity (kips)	Tension Connect. Rupture Capacity (kips)	Length Tens. Member (ft)	No. Of Bolts Tens.	No. Of Holes	Hole Diameter (in)
Leg1	Leg1	SAU	2.5X2X0.1875	33.0	14.86	Comp	1.46	Leg1Y	0.239	NESC Ext	17.444	18.200	21.094	16.406	5.385	2	1.000	0.6875
Leg2	Leg2	SAE	4X4X0.3125	33.0	96.10	Tens	96.10	Leg6Y	59.146	NESC Ext	61.546	109.200	105.469	93.750	4.250	6	2.490	0.6875
Leg3	Leg3	SAE	4X4X0.4375	33.0	96.12	Comp	85.99	Leg8Y	71.734	NESC Ext	83.423	0.000	0.000	0.000	6.152	0	2.600	0.6875
Leg4	Leg4	SAE	5X5X0.375	33.0	96.54	Comp	74.08	Leg13Y	53.932	NESC Ext	98.030	72.800	168.750	187.500	17.942	8	2.480	0.6875
XBrace1	XBrace1	SAE	1.75X1.75X0.1875	33.0	55.44	Tens	55.44	XBrace2X	7.124	NESC Ext	14.585	18.200	21.094	12.850	5.315	2	1.000	0.6875
XBrace2	XBrace2	SAU	3X2X0.25	33.0	44.57	Tens	44.57	XBrace8X	7.926	NESC Ext	17.783	27.300	42.187	32.812	5.836	3	3.440	0.6875
XBrace3	XBrace3	SAE	2.5X2.5X0.25	33.0	65.18	Comp	62.58	XBrace13X	11.390	NESC Ext	30.238	18.200	28.125	21.875	5.836	2	1.000	0.6875
XBrace4	XBrace4	SAE	2X2X0.25	33.0	54.78	Comp	42.93	XBrace14XY	7.813	NESC Ext	22.813	18.200	28.125	21.875	7.844	2	1.000	0.6875
XBrace5	XBrace5	SAE	2X2X0.1875	33.0	62.79	Cross	36.41	XBrace18Y	2.784	NESC Ext	17.258	9.100	10.547	7.646	11.183	1	1.000	0.6875
XBrace6	XBrace6	SAE	2.5X2.5X0.1875	33.0	23.73	Tens	23.73	XBrace21Y	1.946	NESC Ext	22.961	9.100	10.547	8.203	12.709	1	1.000	0.6875
XBrace7	XBrace7	SAE	3X3X0.25	33.0	19.27	Comp	13.45	XBrace22Y	1.224	NESC Ext	37.663	9.100	14.062	10.937	15.168	1	1.000	0.6875
XBrace8	XBrace8	SAU	2X1.5X0.1875	33.0	39.51	Tens	39.51	XBrace24P	5.763	NESC Ext	14.585	18.200	21.094	16.406	24.697	2	1.000	0.6875
Horz1	Horizontal 1	SAE	2X2X0.1875	33.0	59.13	Tens	59.13	Horz1P	4.521	NESC Ext	17.258	9.100	10.547	7.646	4.000	1	1.000	0.6875
Horz2	Horizontal 2	SAU	3X2.5X0.25	33.0	47.17	Comp	0.90	Horz7P	0.082	NESC Ext	30.090	9.100	14.062	9.164	14.400	1	1.000	0.6875
Diag1	Diagonal 1	SAU	3.5X2.5X0.25	33.0	8.61	Comp	0.00	Diagonal 1Y	0.000		34.856	27.300	42.187	32.812	13.153	3	1.550	0.6875
Diag2	Diagonal 2	Bar	2x3/16	33.0	71.53	Tens	71.53	Diagonal 5P	5.228	NESC Hea	7.309	9.100	10.547	8.490	10.589	1	1.000	0.6875
Diag3	Diagonal 3	Bar	2x1/4	33.0	31.12	Tens	31.12	Diagonal 6P	2.832	NESC Hea	9.745	9.100	14.062	11.320	4.000	1	1.000	0.6875
Arm1	Arm1	DAL	2.5X2X0.1875	33.0	70.01	Tens	70.01	Arm2P	6.371	NESC Hea	27.231	9.100	21.094	17.121	4.000	1	4.000	0.6875
Arm2	Arm2	SAE	2.5X2.5X0.25	33.0	24.71	Comp	0.81	Arm8P	0.148	NESC Ext	30.238	18.200	28.125	40.441	4.000	2	1.000	0.6875
Arm3	**Arm3**	**SAU**	**3.5X2.5X0.25**	**33.0**	**30.89**	**Comp**	**0.00**	**Arm6Y**	**0.000**		**34.345**	**18.200**	**28.125**	**25.735**	**4.000**	**2**	**1.650**	**0.6875**

A potentially damaging moment exists in the following members (make sure your system is well triangulated to minimize moments): Arm5P Arm5X Arm5XY Arm5Y ??

Group Label	Group Desc.	Angle Type	Angle Size	Steel Strength (ksi)	Max Usage %	Usage Control	Max Use In Tens. %	Tension Control Member	Tension Force (kips)	Tension Control Load Case	Net Section Capacity (kips)	Tension Connect. Shear Capacity (kips)	Tension Connect. Bearing Capacity (kips)	Tension Connect. Rupture Capacity (kips)	Length Tens. Member (ft)	No. Of Bolts Tens.	No. Of Holes	Hole Diameter (in)
Inner1	Inner1	SAE	1.75X1.75X0.1875	33.0	8.15	Tens	8.15	g63X	0.497	NESC Ext	14.585	9.100	10.547	6.100	5.657	1	1.000	0.6875

Inner2	Inner1	SAU	2X1.5X0.1875	33.0	35.29	Comp	4.98	g64X	0.381	NESC Ext	14.585	9.100	10.547	7.646	20.365	1	1.000 0.6875
XBrace1R	XBrace1R	SAE	2X2X0.3125	36.0	47.17	Comp	46.21	XBrace6X	8.410	NESC Ext	30.299	18.200	33.984	20.543	5.315	2	1.000 0.6875
Horz3	Horizontal 3	SAE	2X2X0.25	33.0	89.45	Tens	89.45	Horz3P	8.140	NESC Ext	22.813	9.100	14.062	10.195	4.000	1	1.000 0.6875

*** Maximum Stress Summary for Each Load Case

Summary of Maximum Usages by Load Case:

Load Case	Maximum Usage %	Element Label	Element Type
NESC Heavy	71.53	Diagonal 5P	Angle
NESC Extreme	96.54	Leg13X	Angle

Summary of Insulator Usages:

Insulator Label	Insulator Type	Maximum Usage %	Load Case	Weight (lbs)
Clamp1	Clamp	3.09	NESC Heavy	0.0
Clamp2	Clamp	3.03	NESC Heavy	0.0
Clamp3	Clamp	4.29	NESC Heavy	0.0
Clamp4	Clamp	4.27	NESC Heavy	0.0
Clamp5	Clamp	4.39	NESC Heavy	0.0
Clamp6	Clamp	4.37	NESC Heavy	0.0
Clamp7	Clamp	4.32	NESC Heavy	0.0
Clamp8	Clamp	4.29	NESC Heavy	0.0
Clamp9	Clamp	15.85	NESC Extreme	0.0
Clamp10	Clamp	1.45	NESC Extreme	0.0
Clamp11	Clamp	1.57	NESC Extreme	0.0
Clamp12	Clamp	2.07	NESC Extreme	0.0
Clamp13	Clamp	2.20	NESC Extreme	0.0
Clamp14	Clamp	2.81	NESC Extreme	0.0
Clamp15	Clamp	4.91	NESC Heavy	0.0
Clamp16	Clamp	19.60	NESC Extreme	0.0
Clamp17	Clamp	1.45	NESC Extreme	0.0
Clamp18	Clamp	1.57	NESC Extreme	0.0
Clamp19	Clamp	2.07	NESC Extreme	0.0
Clamp20	Clamp	2.20	NESC Extreme	0.0
Clamp21	Clamp	2.81	NESC Extreme	0.0
Clamp22	Clamp	4.67	NESC Heavy	0.0
Clamp23	Clamp	12.63	NESC Extreme	0.0
Clamp24	Clamp	17.21	NESC Extreme	0.0
Clamp25	Clamp	14.98	NESC Extreme	0.0
Clamp26	Clamp	18.23	NESC Extreme	0.0
Clamp27	Clamp	12.61	NESC Extreme	0.0
Clamp28	Clamp	8.31	NESC Heavy	0.0
Clamp29	Clamp	0.26	NESC Heavy	0.0
Clamp30	Clamp	0.36	NESC Heavy	0.0
Clamp31	Clamp	0.91	NESC Extreme	0.0
Clamp32	Clamp	0.66	NESC Extreme	0.0

Clamp33	Clamp	0.66	NESC Extreme	0.0
Clamp34	Clamp	1.37	NESC Heavy	0.0
Clamp35	Clamp	0.25	NESC Extreme	0.0
Clamp36	Clamp	0.29	NESC Heavy	0.0
Clamp37	Clamp	0.91	NESC Extreme	0.0
Clamp38	Clamp	0.66	NESC Extreme	0.0
Clamp39	Clamp	0.66	NESC Extreme	0.0
Clamp40	Clamp	1.16	NESC Heavy	0.0
Clamp43	Clamp	0.25	NESC Extreme	0.0
Clamp44	Clamp	0.25	NESC Extreme	0.0

*** Weight of structure (lbs):
Weight of Angles*Section DLF: 8490.0
Total: 8490.0

*** End of Report

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*****************************************************************************
*                                                                           *
* TOWER - Analysis and Design -  Copyright Power Line Systems, Inc. 1986-2011 *
*                                                                           *
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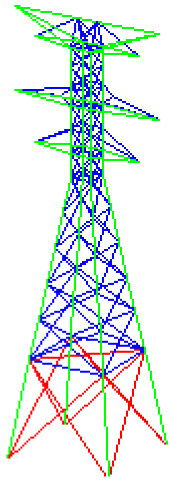
Project Name : 13305.000 - Meriden, CT
Project Notes: CL&P Structure # 783/ AT&T CT2117
Project File : J:\Jobs\1330500.WI\04_Structural\Backup Documentation\Calcs\Rev (4)\PLS Tower\pls tower - reinforced.tow
Date run : 10:20:30 AM Monday, October 06, 2014
by : Tower Version 12.50
Licensed to : Centek Engineering Inc

Successfully performed nonlinear analysis

Member "Leg6P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "Leg6X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "Leg6XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "Leg6Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "Leg11P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "Leg11X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "Leg11XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "Leg11Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "Leg13P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "Leg13X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "Leg13XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "Leg13Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "XBrace8P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "XBrace8X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "XBrace8XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "XBrace8Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "XBrace9P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "XBrace9X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "XBrace9XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "XBrace9Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "XBrace10P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "XBrace10X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end,

edge and spacing distances will be checked. ??
Member "XBrace10XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "XBrace10Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "XBrace11P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "XBrace11X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "XBrace11XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "XBrace11Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "XBrace12P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "XBrace12X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "XBrace12XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "XBrace12Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "XBrace13P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "XBrace13X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "XBrace13XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "XBrace13Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "Arm5P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "Arm5X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "Arm5XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "Arm5Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "Arm6P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "Arm6Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "Diagonal 1P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "Diagonal 1X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "Diagonal 1XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "Diagonal 1Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
The model has 46 warnings. ??



Nonlinear convergence parameters: Use Standard Parameters
Tension only member maximum compression load as a percent of compression capacity: 100%
Member check option: ASCE 10
Connection rupture check: ASCE 10
Crossing diagonal check: ASCE 10 [Alternate Unsupported RLOUT = 1]
Included angle check: None
Climbing load check: None
Redundant members checked with: Actual Force

Joints Geometry:

Joint Label	Symmetry Code	X Coord. (ft)	Y Coord. (ft)	Z Coord. (ft)	X Disp. Rest.	Y Disp. Rest.	Z Disp. Rest.	X Rot. Rest.	Y Rot. Rest.	Z Rot. Rest.
1P	X-Symmetry	0	-2	78.25	Free	Free	Free	Free	Free	Free
2P	XY-Symmetry	2	-2	73.25	Free	Free	Free	Free	Free	Free
7P	XY-Symmetry	2	-2	54.25	Free	Free	Free	Free	Free	Free
8P	XY-Symmetry	2	-2	50	Free	Free	Free	Free	Free	Free
9P	XY-Symmetry	10	-10	0	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
15P	X-Symmetry	0	-14	78.25	Free	Free	Free	Free	Free	Free
16P	X-Symmetry	0	-10	73.25	Free	Free	Free	Free	Free	Free
17P	X-Symmetry	0	-14	62.75	Free	Free	Free	Free	Free	Free
18P	X-Symmetry	0	-10	54.25	Free	Free	Free	Free	Free	Free
19P	XY-Symmetry	2	3.75	64.5	Free	Free	Free	Free	Free	Free
1X	X-Gen	0	2	78.25	Free	Free	Free	Free	Free	Free
2X	X-GenXY	2	2	73.25	Free	Free	Free	Free	Free	Free
2XY	XY-GenXY	-2	2	73.25	Free	Free	Free	Free	Free	Free
2Y	Y-GenXY	-2	-2	73.25	Free	Free	Free	Free	Free	Free
7X	X-GenXY	2	2	54.25	Free	Free	Free	Free	Free	Free
7XY	XY-GenXY	-2	2	54.25	Free	Free	Free	Free	Free	Free
7Y	Y-GenXY	-2	-2	54.25	Free	Free	Free	Free	Free	Free
8X	X-GenXY	2	2	50	Free	Free	Free	Free	Free	Free
8XY	XY-GenXY	-2	2	50	Free	Free	Free	Free	Free	Free
8Y	Y-GenXY	-2	-2	50	Free	Free	Free	Free	Free	Free
9X	X-GenXY	10	10	0	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
9XY	XY-GenXY	-10	10	0	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed

9Y	Y-GenXY	-10	-10	0	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
15X	X-Gen	0	14	78.25	Free	Free	Free	Free	Free	Free
16X	X-Gen	0	10	73.25	Free	Free	Free	Free	Free	Free
17X	X-Gen	0	14	62.75	Free	Free	Free	Free	Free	Free
18X	X-Gen	0	10	54.25	Free	Free	Free	Free	Free	Free
19X	X-GenXY	2	-3.75	64.5	Free	Free	Free	Free	Free	Free
19XY	XY-GenXY	-2	-3.75	64.5	Free	Free	Free	Free	Free	Free
19Y	Y-GenXY	-2	3.75	64.5	Free	Free	Free	Free	Free	Free

Secondary Joints:

Joint Label	Symmetry Code	Origin Joint	End Joint	Fraction	Elevation (ft)	X Disp. Rest.	Y Disp. Rest.	Z Disp. Rest.	X Rot. Rest.	Y Rot. Rest.	Z Rot. Rest.
3S	XY-Symmetry	2P	7P	0	69.75	Free	Free	Free	Free	Free	Free
4S	XY-Symmetry	2P	7P	0	66.25	Free	Free	Free	Free	Free	Free
5S	XY-Symmetry	2P	7P	0	62.75	Free	Free	Free	Free	Free	Free
6S	XY-Symmetry	2P	7P	0	58.5	Free	Free	Free	Free	Free	Free
10S	XY-Symmetry	8P	9P	0	44	Free	Free	Free	Free	Free	Free
11S	XY-Symmetry	8P	9P	0	37.5	Free	Free	Free	Free	Free	Free
12S	XY-Symmetry	8P	9P	0	31	Free	Free	Free	Free	Free	Free
13S	XY-Symmetry	8P	9P	0	24.83	Free	Free	Free	Free	Free	Free
14S	XY-Symmetry	8P	9P	0	17.5	Free	Free	Free	Free	Free	Free
3X	X-GenXY	2P	7P	0	69.75	Free	Free	Free	Free	Free	Free
3XY	XY-GenXY	2P	7P	0	69.75	Free	Free	Free	Free	Free	Free
3Y	Y-GenXY	2P	7P	0	69.75	Free	Free	Free	Free	Free	Free
4X	X-GenXY	2P	7P	0	66.25	Free	Free	Free	Free	Free	Free
4XY	XY-GenXY	2P	7P	0	66.25	Free	Free	Free	Free	Free	Free
4Y	Y-GenXY	2P	7P	0	66.25	Free	Free	Free	Free	Free	Free
5X	X-GenXY	2P	7P	0	62.75	Free	Free	Free	Free	Free	Free
5XY	XY-GenXY	2P	7P	0	62.75	Free	Free	Free	Free	Free	Free
5Y	Y-GenXY	2P	7P	0	62.75	Free	Free	Free	Free	Free	Free
6X	X-GenXY	2P	7P	0	58.5	Free	Free	Free	Free	Free	Free
6XY	XY-GenXY	2P	7P	0	58.5	Free	Free	Free	Free	Free	Free
6Y	Y-GenXY	2P	7P	0	58.5	Free	Free	Free	Free	Free	Free
10X	X-GenXY	8P	9P	0	44	Free	Free	Free	Free	Free	Free
10XY	XY-GenXY	8P	9P	0	44	Free	Free	Free	Free	Free	Free
10Y	Y-GenXY	8P	9P	0	44	Free	Free	Free	Free	Free	Free
11X	X-GenXY	8P	9P	0	37.5	Free	Free	Free	Free	Free	Free
11XY	XY-GenXY	8P	9P	0	37.5	Free	Free	Free	Free	Free	Free
11Y	Y-GenXY	8P	9P	0	37.5	Free	Free	Free	Free	Free	Free
12X	X-GenXY	8P	9P	0	31	Free	Free	Free	Free	Free	Free
12XY	XY-GenXY	8P	9P	0	31	Free	Free	Free	Free	Free	Free
12Y	Y-GenXY	8P	9P	0	31	Free	Free	Free	Free	Free	Free
13X	X-GenXY	8P	9P	0	24.83	Free	Free	Free	Free	Free	Free
13XY	XY-GenXY	8P	9P	0	24.83	Free	Free	Free	Free	Free	Free
13Y	Y-GenXY	8P	9P	0	24.83	Free	Free	Free	Free	Free	Free
14X	X-GenXY	8P	9P	0	17.5	Free	Free	Free	Free	Free	Free
14XY	XY-GenXY	8P	9P	0	17.5	Free	Free	Free	Free	Free	Free
14Y	Y-GenXY	8P	9P	0	17.5	Free	Free	Free	Free	Free	Free

The model contains 30 primary and 36 secondary joints for a total of 66 joints.

Steel Material Properties:

Steel Material Label	Modulus of Elasticity	Yield Stress Fy	Ultimate Stress Fu	Member Stress All. Hyp. 1	Member Stress All. Hyp. 2	Member Rupture Hyp. 1	Member Rupture Hyp. 2	Member Bearing Hyp. 1	Member Bearing Hyp. 2

	(ksi)	(ksi)	(ksi)	(ksi)	(ksi)	(ksi)	(ksi)	(ksi)	(ksi)
A 36	2.9e+004	36	58	0	0	0	0	0	0
A7	2.9e+004	33	60	0	0	0	0	0	0

Bolt Properties:

Bolt Label	Bolt Diameter (in)	Hole Diameter (in)	Ultimate Shear Capacity (kips)	Default End Distance (in)	Default Bolt Spacing (in)	Shear Capacity Hyp. 1 (kips)	Shear Capacity Hyp. 2 (kips)
5/8 A394	0.625	0.6875	9.1	1.125	1.5	0	0

Number Bolts Used By Type:

Bolt Type	Number Bolts
5/8 A394	375

Angle Properties:

Angle Type	Angle Size	Long Leg (in)	Short Leg (in)	Thick. (in)	Unit Weight (lbs/ft)	Gross Area (in^2)	w/t Ratio	Radius of Gyration Rx (in)	Radius of Gyration Ry (in)	Radius of Gyration Rz (in)	Number of Angles	Wind Width (in)	Short Edge Dist. (in)	Long Edge Dist. (in)	Optimize Cost Factor	Section Modulus (in^3)
SAE	5X5X0.375	5	5	0.375	12.3	3.61	11	1.56	1.56	0.99	1	5	2.5	0	1.0000	0
SAE	4X4X0.4375	4	4	0.4375	11.3	3.31	7.29	1.23	1.23	0.785	1	4	2	0	1.0000	0
SAE	4X4X0.3125	4	4	0.3125	8.2	2.4	10.6	1.24	1.24	0.791	1	4	2	0	1.0000	0
SAE	3X3X0.25	3	3	0.25	4.9	1.44	9.75	0.93	0.93	0.592	1	3	1.5	0	1.0000	0
SAE	2.5X2.5X0.25	2.5	2.5	0.25	4.1	1.19	7.75	0.769	0.769	0.491	1	2.5	1.25	0	1.0000	0
SAE	2.5X2.5X0.1875	2.5	2.5	0.1875	3.07	0.902	10.67	0.778	0.778	0.495	1	2.5	1.25	0	1.0000	0
SAE	2X2X0.3125	2	2	0.3125	3.92	1.15	3.8	0.601	0.601	0.39	1	2	1	0	1.0000	0
SAE	2X2X0.25	2	2	0.25	3.19	0.94	5	0.609	0.609	0.391	1	2	1	0	1.0000	0
SAE	2X2X0.1875	2	2	0.1875	2.44	0.71	8	0.617	0.617	0.394	1	2	1	0	1.0000	0
SAE	1.75X1.75X0.1875	1.75	1.75	0.1875	2.12	0.62	6	0.537	0.537	0.343	1	1.75	0.875	0	1.0000	0
SAU	3.5X2.5X0.25	3.5	2.5	0.25	4.9	1.44	11.25	1.12	0.735	0.544	1	3.5	1.25	0	1.0000	0
SAU	3X2.5X0.25	3	2.5	0.25	4.5	1.31	9.5	0.945	0.753	0.528	1	3	1.25	0	1.0000	0
SAU	3X2X0.25	3	2	0.25	4.1	1.19	9.75	0.957	0.574	0.435	1	3	1	0	1.0000	0
SAU	2.5X2X0.1875	2.5	2	0.1875	2.75	0.81	10.67	0.793	0.6	0.427	1	2.5	1	0	1.0000	0
SAU	2X1.5X0.1875	2	1.5	0.1875	2.12	0.62	8.33	0.632	0.44	0.322	1	2	0.75	0	1.0000	0
DAL	2.5X2X0.1875	2.5	2	0.1875	5.5	1.62	10.67	0.793	0.923	0.793	2	2.5	1	0	1.0000	0
Bar	2x3/16	2	0	0.1875	1.28	0.375	10.67	1	1	1	1	2	0	0	0.0000	0
Bar	2x1/4	2	0	0.25	1.7	0.5	8	1	1	1	1	2	0	0	0.0000	0

Angle Groups:

Group Label	Group Description	Angle Type	Angle Size	Material Type	Element Type	Group Type	Optimize Group	Allow. Add. Angle Width For Optimize (in)
Leg1	Leg1	SAU	2.5X2X0.1875	A7	Truss	Other	None	0.000
Leg2	Leg2	SAE	4X4X0.3125	A7	Beam	Leg	None	0.000
Leg3	Leg3	SAE	4X4X0.4375	A7	Beam	Leg	None	0.000
Leg4	Leg4	SAE	5X5X0.375	A7	Beam	Leg	None	0.000
XBrace1	XBrace1	SAE	1.75X1.75X0.1875	A7	Truss	Crossing Diagonal	None	0.000

XBrace2	XBrace2	SAU	3X2X0.25	A7	Truss	Crossing Diagonal	None	0.000
XBrace3	XBrace3	SAE	2.5X2.5X0.25	A7	Truss	Crossing Diagonal	None	0.000
XBrace4	XBrace4	SAE	2X2X0.25	A7	Truss	Crossing Diagonal	None	0.000
XBrace5	XBrace5	SAE	2X2X0.1875	A7	Truss	Crossing Diagonal	None	0.000
XBrace6	XBrace6	SAE	2.5X2.5X0.1875	A7	Truss	Crossing Diagonal	None	0.000
XBrace7	XBrace7	SAE	3X3X0.25	A7	Truss	Crossing Diagonal	None	0.000
XBrace8	XBrace8	SAU	2X1.5X0.1875	A7	T-Only	Other	None	0.000
Horz1	Horizontal 1	SAE	2X2X0.1875	A7	Truss	Other	None	0.000
Horz2	Horizontal 2	SAU	3X2.5X0.25	A7	Truss	Other	None	0.000
Diag1	Diagonal 1	SAU	3.5X2.5X0.25	A7	Beam	Other	None	0.000
Diag2	Diagonal 2	Bar	2x3/16	A7	Truss	Other	None	0.000
Diag3	Diagonal 3	Bar	2x1/4	A7	Truss	Other	None	0.000
Arm1	Arm1	DAL	2.5X2X0.1875	A7	Beam	Other	None	0.000
Arm2	Arm2	SAE	2.5X2.5X0.25	A7	Beam	Other	None	0.000
Arm3	Arm3	SAU	3.5X2.5X0.25	A7	Beam	Other	None	0.000
Inner1	Inner1	SAE	1.75X1.75X0.1875	A7	Truss	Other	None	0.000
Inner2	Inner1	SAU	2X1.5X0.1875	A7	T-Only	Other	None	0.000
XBrace1R	XBrace1R	SAE	2X2X0.3125	A 36	Truss	Crossing Diagonal	None	0.000
Horz3	Horizontal 3	SAE	2X2X0.25	A7	Truss	Other	None	0.000

Aggregate Angle Information:

Note: Estimate of surface area reported for painting purposes, not wind loading.

Angle Type	Angle Size	Material Type	Total Length (ft)	Total Surface Area (ft^2)	Total Weight (lbs)
SAU	2.5X2X0.1875	A7	21.54	16.16	59.24
SAE	4X4X0.3125	A7	76.00	101.33	623.20
SAE	4X4X0.4375	A7	120.23	160.30	1358.55
SAE	5X5X0.375	A7	101.83	169.72	1252.52
SAE	1.75X1.75X0.1875	A7	114.61	66.85	242.97
SAE	2X2X0.3125	A 36	85.04	56.69	333.36
SAU	3X2X0.25	A7	93.38	77.82	382.86
SAE	2.5X2.5X0.25	A7	128.66	107.22	527.51
SAE	2X2X0.25	A7	147.39	98.26	470.17
SAE	2X2X0.1875	A7	121.46	80.97	296.37
SAE	2.5X2.5X0.1875	A7	101.67	84.73	312.14
SAE	3X3X0.25	A7	121.34	121.34	594.58
SAU	2X1.5X0.1875	A7	238.30	139.01	505.20
SAU	3X2.5X0.25	A7	57.60	52.80	259.20
DAL	2.5X2X0.1875	A7	28.00	21.00	154.00
SAU	3.5X2.5X0.25	A7	109.27	109.27	535.44
Bar	2x3/16	A7	118.13	39.38	151.21
Bar	2x1/4	A7	16.00	5.33	27.20

Sections:
The adjustment factors below only apply to dead load and wind areas that are calculated for members in the model.
They do not apply to equipment or to manually input dead load and drag areas.

Section Label	Joint Defining Section Bottom	Dead Load Adjust. Factor	Transverse Drag x Area Factor For Face	Longitudinal Drag x Area Factor For Face	Transverse Area Factor (CD From Code)	Longitudinal Area Factor (CD From Code)	Af Flat Factor For Face EIA Only	Ar Round Factor For Face EIA Only	Transverse Drag x Area Factor For All	Longitudinal Drag x Area Factor For All	SAPS Angle Drag x Area Factor	SAPS Round Drag x Area Factor	Force Solid Face
1	8P	1.050	3.300	3.300	1.100	1.100	0.000	0.000	1.000	1.000	0.000	0.000	None
2	9P	1.050	3.300	3.300	1.100	1.100	0.000	0.000	1.000	1.000	0.000	0.000	None

Angle Member Connectivity:

Member Label	Group Label	Section Label	Symmetry Code	Origin Joint	End Joint	Ecc. Code	Rest. Code	Ratio RLX	Ratio RLY	Ratio RLZ	Bolt Type	# Bolts	# Bolt Holes	# Shear Planes	Connect Leg	Short Edge Dist. (in)	Long Edge Dist. (in)	End Dist. (in)	Bolt Spacing (in)	Shear Path Length (in)	Tension Path Length (in)	Rest. Coef.
Leg1P	Leg1		XY-Symmetry	1P	2P	3	4	1	1	1	5/8 A394	2	1	1	Short only	0.875	0	0.875	3.5	0	0	0
Leg1X	Leg1		X-GenXY	1X	2X	3	4	1	1	1	5/8 A394	2	1	1	Short only	0.875	0	0.875	3.5	0	0	0
Leg1XY	Leg1		XY-GenXY	1X	2XY	3	4	1	1	1	5/8 A394	2	1	1	Short only	0.875	0	0.875	3.5	0	0	0
Leg1Y	Leg1		Y-GenXY	1P	2Y	3	4	1	1	1	5/8 A394	2	1	1	Short only	0.875	0	0.875	3.5	0	0	0
Leg2P	Leg2		XY-Symmetry	2P	3S	1	4	1	1	1	5/8 A394	0	2.5	0		0	0	0	0	0	0	0
Leg2X	Leg2		X-GenXY	2X	3X	1	4	1	1	1	5/8 A394	0	2.5	0		0	0	0	0	0	0	0
Leg2XY	Leg2		XY-GenXY	2XY	3XY	1	4	1	1	1	5/8 A394	0	2.5	0		0	0	0	0	0	0	0
Leg2Y	Leg2		Y-GenXY	2Y	3Y	1	4	1	1	1	5/8 A394	0	2.5	0		0	0	0	0	0	0	0
Leg3P	Leg2		XY-Symmetry	3S	4S	1	4	1	1	1	5/8 A394	0	2.5	0		0	0	0	0	0	0	0
Leg3X	Leg2		X-GenXY	3X	4X	1	4	1	1	1	5/8 A394	0	2.5	0		0	0	0	0	0	0	0
Leg3XY	Leg2		XY-GenXY	3XY	4XY	1	4	1	1	1	5/8 A394	0	2.5	0		0	0	0	0	0	0	0
Leg3Y	Leg2		Y-GenXY	3Y	4Y	1	4	1	1	1	5/8 A394	0	2.5	0		0	0	0	0	0	0	0
Leg4P	Leg2		XY-Symmetry	4S	5S	1	4	1	1	1	5/8 A394	0	2.5	0		0	0	0	0	0	0	0
Leg4X	Leg2		X-GenXY	4X	5X	1	4	1	1	1	5/8 A394	0	2.5	0		0	0	0	0	0	0	0
Leg4XY	Leg2		XY-GenXY	4XY	5XY	1	4	1	1	1	5/8 A394	0	2.5	0		0	0	0	0	0	0	0
Leg4Y	Leg2		Y-GenXY	4Y	5Y	1	4	1	1	1	5/8 A394	0	2.5	0		0	0	0	0	0	0	0
Leg5P	Leg2		XY-Symmetry	5S	6S	1	4	1	1	1	5/8 A394	0	2.5	0		0	0	0	0	0	0	0
Leg5X	Leg2		X-GenXY	5X	6X	1	4	1	1	1	5/8 A394	0	2.5	0		0	0	0	0	0	0	0
Leg5XY	Leg2		XY-GenXY	5XY	6XY	1	4	1	1	1	5/8 A394	0	2.5	0		0	0	0	0	0	0	0
Leg5Y	Leg2		Y-GenXY	5Y	6Y	1	4	1	1	1	5/8 A394	0	2.5	0		0	0	0	0	0	0	0
Leg6P	Leg2		XY-Symmetry	6S	7P	1	4	1	1	1	5/8 A394	6	2.49	2	Both	1.5	2.75	1	2.5	0	0	0
Leg6X	Leg2		X-GenXY	6X	7X	1	4	1	1	1	5/8 A394	6	2.49	2	Both	1.5	2.75	1	2.5	0	0	0
Leg6XY	Leg2		XY-GenXY	6XY	7XY	1	4	1	1	1	5/8 A394	6	2.49	2	Both	1.5	2.75	1	2.5	0	0	0

Leg6Y	Leg2	Y-GenXY	6Y	7Y	1	4	1	1	1	5/8	A394	6	2.49	2	Both	1.5	2.75	1	2.5	0	0	0
Leg7P	Leg3	XY-Symmetry	7P	8P	1	4	1	1	1	5/8	A394	0	2.6	0		0	0	0	0	0	0	0
Leg7X	Leg3	X-GenXY	7X	8X	1	4	1	1	1	5/8	A394	0	2.6	0		0	0	0	0	0	0	0
Leg7XY	Leg3	XY-GenXY	7XY	8XY	1	4	1	1	1	5/8	A394	0	2.6	0		0	0	0	0	0	0	0
Leg7Y	Leg3	Y-GenXY	7Y	8Y	1	4	1	1	1	5/8	A394	0	2.6	0		0	0	0	0	0	0	0
Leg8P	Leg3	XY-Symmetry	8P	10S	1	4	1	1	1	5/8	A394	0	2.6	0		0	0	0	0	0	0	0
Leg8X	Leg3	X-GenXY	8X	10X	1	4	1	1	1	5/8	A394	0	2.6	0		0	0	0	0	0	0	0
Leg8XY	Leg3	XY-GenXY	8XY	10XY	1	4	1	1	1	5/8	A394	0	2.6	0		0	0	0	0	0	0	0
Leg8Y	Leg3	Y-GenXY	8Y	10Y	1	4	1	1	1	5/8	A394	0	2.6	0		0	0	0	0	0	0	0
Leg9P	Leg3	XY-Symmetry	10S	11S	1	4	1	1	1	5/8	A394	0	2.6	0		0	0	0	0	0	0	0
Leg9X	Leg3	X-GenXY	10X	11X	1	4	1	1	1	5/8	A394	0	2.6	0		0	0	0	0	0	0	0
Leg9XY	Leg3	XY-GenXY	10XY	11XY	1	4	1	1	1	5/8	A394	0	2.6	0		0	0	0	0	0	0	0
Leg9Y	Leg3	Y-GenXY	10Y	11Y	1	4	1	1	1	5/8	A394	0	2.6	0		0	0	0	0	0	0	0
Leg10P	Leg3	XY-Symmetry	11S	12S	1	4	1	1	1	5/8	A394	0	2.6	0		0	0	0	0	0	0	0
Leg10X	Leg3	X-GenXY	11X	12X	1	4	1	1	1	5/8	A394	0	2.6	0		0	0	0	0	0	0	0
Leg10XY	Leg3	XY-GenXY	11XY	12XY	1	4	1	1	1	5/8	A394	0	2.6	0		0	0	0	0	0	0	0
Leg10Y	Leg3	Y-GenXY	11Y	12Y	1	4	1	1	1	5/8	A394	0	2.6	0		0	0	0	0	0	0	0
Leg11P	Leg3	XY-Symmetry	12S	13S	1	4	1	1	1	5/8	A394	8	3.45	1	Both	0.875	2.125	1.3125	2.75	0	0	0
Leg11X	Leg3	X-GenXY	12X	13X	1	4	1	1	1	5/8	A394	8	3.45	1	Both	0.875	2.125	1.3125	2.75	0	0	0
Leg11XY	Leg3	XY-GenXY	12XY	13XY	1	4	1	1	1	5/8	A394	8	3.45	1	Both	0.875	2.125	1.3125	2.75	0	0	0
Leg11Y	Leg3	Y-GenXY	12Y	13Y	1	4	1	1	1	5/8	A394	8	3.45	1	Both	0.875	2.125	1.3125	2.75	0	0	0
Leg12P	Leg4	XY-Symmetry	13S	14S	1	4	1	1	1	5/8	A394	0	3.95	0		0	0	0	0	0	0	0
Leg12X	Leg4	X-GenXY	13X	14X	1	4	1	1	1	5/8	A394	0	3.95	0		0	0	0	0	0	0	0
Leg12XY	Leg4	XY-GenXY	13XY	14XY	1	4	1	1	1	5/8	A394	0	3.95	0		0	0	0	0	0	0	0
Leg12Y	Leg4	Y-GenXY	13Y	14Y	1	4	1	1	1	5/8	A394	0	3.95	0		0	0	0	0	0	0	0
Leg13P	Leg4	XY-Symmetry	14S	9P	1	4	0.5	0.5	0.5	5/8	A394	8	2.48	1	Both	1.25	2.75	1.25	5	0	0	0
Leg13X	Leg4	X-GenXY	14X	9X	1	4	0.5	0.5	0.5	5/8	A394	8	2.48	1	Both	1.25	2.75	1.25	5	0	0	0
Leg13XY	Leg4	XY-GenXY	14XY	9XY	1	4	0.5	0.5	0.5	5/8	A394	8	2.48	1	Both	1.25	2.75	1.25	5	0	0	0
Leg13Y	Leg4	Y-GenXY	14Y	9Y	1	4	0.5	0.5	0.5	5/8	A394	8	2.48	1	Both	1.25	2.75	1.25	5	0	0	0
XBrace1P	XBrace1	XY-Symmetry	1P	2X	2	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.875				

																			0	0	0	0
XBrace1X	XBrace1	X-GenXY	1X	2P	2	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.875	0	0	0	0
XBrace1XY	XBrace1	XY-GenXY	1X	2Y	2	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.875	0	0	0	0
XBrace1Y	XBrace1	Y-GenXY	1P	2XY	2	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.875	0	0	0	0
XBrace2P	XBrace1	XY-Symmetry	2P	3X	2	5	0.75	0.5	0.5	5/8	A394	2	1	1	Short only	0.75	0	0.875	1.6875	0	0	0
XBrace2X	XBrace1	X-GenXY	2X	3S	2	5	0.75	0.5	0.5	5/8	A394	2	1	1	Short only	0.75	0	0.875	1.6875	0	0	0
XBrace2XY	XBrace1	XY-GenXY	2XY	3Y	2	5	0.75	0.5	0.5	5/8	A394	2	1	1	Short only	0.75	0	0.875	1.6875	0	0	0
XBrace2Y	XBrace1	Y-GenXY	2Y	3XY	2	5	0.75	0.5	0.5	5/8	A394	2	1	1	Short only	0.75	0	0.875	1.6875	0	0	0
XBrace3P	XBrace1	XY-Symmetry	2X	3XY	2	5	0.75	0.5	0.5	5/8	A394	2	1	1	Short only	0.75	0	0.875	1.6875	0	0	0
XBrace3X	XBrace1	X-GenXY	2P	3Y	2	5	0.75	0.5	0.5	5/8	A394	2	1	1	Short only	0.75	0	0.875	1.6875	0	0	0
XBrace3XY	XBrace1	XY-GenXY	2Y	3S	2	5	0.75	0.5	0.5	5/8	A394	2	1	1	Short only	0.75	0	0.875	1.6875	0	0	0
XBrace3Y	XBrace1	Y-GenXY	2XY	3X	2	5	0.75	0.5	0.5	5/8	A394	2	1	1	Short only	0.75	0	0.875	1.6875	0	0	0
XBrace4P	XBrace1R	XY-Symmetry	3S	4X	2	5	0.75	0.5	0.5	5/8	A394	2	1	1	Short only	0.75	0	0.875	1.6875	0	0	0
XBrace4X	XBrace1R	X-GenXY	3X	4S	2	5	0.75	0.5	0.5	5/8	A394	2	1	1	Short only	0.75	0	0.875	1.6875	0	0	0
XBrace4XY	XBrace1R	XY-GenXY	3XY	4Y	2	5	0.75	0.5	0.5	5/8	A394	2	1	1	Short only	0.75	0	0.875	1.6875	0	0	0
XBrace4Y	XBrace1R	Y-GenXY	3Y	4XY	2	5	0.75	0.5	0.5	5/8	A394	2	1	1	Short only	0.75	0	0.875	1.6875	0	0	0
XBrace5P	XBrace1R	XY-Symmetry	3X	4XY	2	5	0.75	0.5	0.5	5/8	A394	2	1	1	Short only	0.75	0	0.875	1.6875	0	0	0
XBrace5X	XBrace1R	X-GenXY	3S	4Y	2	5	0.75	0.5	0.5	5/8	A394	2	1	1	Short only	0.75	0	0.875	1.6875	0	0	0
XBrace5XY	XBrace1R	XY-GenXY	3Y	4S	2	5	0.75	0.5	0.5	5/8	A394	2	1	1	Short only	0.75	0	0.875	1.6875	0	0	0
XBrace5Y	XBrace1R	Y-GenXY	3XY	4X	2	5	0.75	0.5	0.5	5/8	A394	2	1	1	Short only	0.75	0	0.875	1.6875	0	0	0
XBrace6P	XBrace1R	XY-Symmetry	4S	5X	2	5	0.75	0.5	0.5	5/8	A394	2	1	1	Short only	0.75	0	0.875	1.625	0	0	0
XBrace6X	XBrace1R	X-GenXY	4X	5S	2	5	0.75	0.5	0.5	5/8	A394	2	1	1	Short only	0.75	0	0.875	1.625	0	0	0
XBrace6XY	XBrace1R	XY-GenXY	4XY	5Y	2	5	0.75	0.5	0.5	5/8	A394	2	1	1	Short only	0.75	0	0.875	1.625	0	0	0
XBrace6Y	XBrace1R	Y-GenXY	4Y	5XY	2	5	0.75	0.5	0.5	5/8	A394	2	1	1	Short only	0.75	0	0.875	1.625	0	0	0
XBrace7P	XBrace1R	XY-Symmetry	4X	5XY	2	5	0.75	0.5	0.5	5/8	A394	2	1	1	Short only	0.75	0	0.875	1.625	0	0	0
XBrace7X	XBrace1R	X-GenXY	4S	5Y	2	5	0.75	0.5	0.5	5/8	A394	2	1	1	Short only	0.75	0	0.875	1.625	0	0	0
XBrace7XY	XBrace1R	XY-GenXY	4Y	5S	2	5	0.75	0.5	0.5	5/8	A394	2	1	1	Short only	0.75	0	0.875	1.625	0	0	0
XBrace7Y	XBrace1R	Y-GenXY	4XY	5X	2	5	0.75	0.5	0.5	5/8	A394	2	1	1	Short only	0.75	0	0.875	1.625	0	0	0
XBrace8P	XBrace2	XY-Symmetry	5S	6X	2	5	0.5	0.75	0.5	5/8	A394	3	3.44	1	Long only	0.875	2	0.875	2.625	0	0	0
XBrace8X	XBrace2	X-GenXY	5X	6S	2	5	0.5	0.75	0.5	5/8	A394	3	3.44	1	Long only	0.875	2	0.875	2.625	0	0	0

XBrace8XY	XBrace2	XY-GenXY	5XY	6Y	2	5	0.5	0.75	0.5	5/8 A394	3	3.44	1	Long only	0.875	2	0.875	2.625	0	0	0
XBrace8Y	XBrace2	Y-GenXY	5Y	6XY	2	5	0.5	0.75	0.5	5/8 A394	3	3.44	1	Long only	0.875	2	0.875	2.625	0	0	0
XBrace9P	XBrace2	XY-Symmetry	5X	6XY	2	5	0.5	0.75	0.5	5/8 A394	3	3.44	1	Long only	0.875	2	0.875	2.625	0	0	0
XBrace9X	XBrace2	X-GenXY	5S	6Y	2	5	0.5	0.75	0.5	5/8 A394	3	3.44	1	Long only	0.875	2	0.875	2.625	0	0	0
XBrace9XY	XBrace2	XY-GenXY	5Y	6S	2	5	0.5	0.75	0.5	5/8 A394	3	3.44	1	Long only	0.875	2	0.875	2.625	0	0	0
XBrace9Y	XBrace2	Y-GenXY	5XY	6X	2	5	0.5	0.75	0.5	5/8 A394	3	3.44	1	Long only	0.875	2	0.875	2.625	0	0	0
XBrace10P	XBrace2	XY-Symmetry	6S	7X	2	5	0.5	0.75	0.5	5/8 A394	3	2.71	1	Long only	0.875	2	0.875	4	0	0	0
XBrace10X	XBrace2	X-GenXY	6X	7P	2	5	0.5	0.75	0.5	5/8 A394	3	2.71	1	Long only	0.875	2	0.875	4	0	0	0
XBrace10XY	XBrace2	XY-GenXY	6XY	7Y	2	5	0.5	0.75	0.5	5/8 A394	3	2.71	1	Long only	0.875	2	0.875	4	0	0	0
XBrace10Y	XBrace2	Y-GenXY	6Y	7XY	2	5	0.5	0.75	0.5	5/8 A394	3	2.71	1	Long only	0.875	2	0.875	4	0	0	0
XBrace11P	XBrace2	XY-Symmetry	6X	7XY	2	5	0.5	0.75	0.5	5/8 A394	3	2.71	1	Long only	0.875	2	0.875	4	0	0	0
XBrace11X	XBrace2	X-GenXY	6S	7Y	2	5	0.5	0.75	0.5	5/8 A394	3	2.71	1	Long only	0.875	2	0.875	4	0	0	0
XBrace11XY	XBrace2	XY-GenXY	6Y	7P	2	5	0.5	0.75	0.5	5/8 A394	3	2.71	1	Long only	0.875	2	0.875	4	0	0	0
XBrace11Y	XBrace2	Y-GenXY	6XY	7X	2	5	0.5	0.75	0.5	5/8 A394	3	2.71	1	Long only	0.875	2	0.875	4	0	0	0
XBrace12P	XBrace3	XY-Symmetry	7P	8X	2	5	0.75	0.5	0.5	5/8 A394	2	1	1	Short only	1	1.25	0.875	3.5	0	0	0
XBrace12X	XBrace3	X-GenXY	7X	8P	2	5	0.75	0.5	0.5	5/8 A394	2	1	1	Short only	1	1.25	0.875	3.5	0	0	0
XBrace12XY	XBrace3	XY-GenXY	7XY	8Y	2	5	0.75	0.5	0.5	5/8 A394	2	1	1	Short only	1	1.25	0.875	3.5	0	0	0
XBrace12Y	XBrace3	Y-GenXY	7Y	8XY	2	5	0.75	0.5	0.5	5/8 A394	2	1	1	Short only	1	1.25	0.875	3.5	0	0	0
XBrace13P	XBrace3	XY-Symmetry	7X	8XY	2	5	0.75	0.5	0.5	5/8 A394	2	1	1	Short only	1	1.25	0.875	3.5	0	0	0
XBrace13X	XBrace3	X-GenXY	7P	8Y	2	5	0.75	0.5	0.5	5/8 A394	2	1	1	Short only	1	1.25	0.875	3.5	0	0	0
XBrace13XY	XBrace3	XY-GenXY	7Y	8P	2	5	0.75	0.5	0.5	5/8 A394	2	1	1	Short only	1	1.25	0.875	3.5	0	0	0
XBrace13Y	XBrace3	Y-GenXY	7XY	8X	2	5	0.75	0.5	0.5	5/8 A394	2	1	1	Short only	1	1.25	0.875	3.5	0	0	0
XBrace14P	XBrace4	XY-Symmetry	8X	10S	2	5	0.791	0.582	0.582	5/8 A394	2	1	1	Short only	0.875	0	0.875	2.5	0	0	0
XBrace14X	XBrace4	X-GenXY	8P	10X	2	5	0.791	0.582	0.582	5/8 A394	2	1	1	Short only	0.875	0	0.875	2.5	0	0	0
XBrace14XY	XBrace4	XY-GenXY	8Y	10XY	2	5	0.791	0.582	0.582	5/8 A394	2	1	1	Short only	0.875	0	0.875	2.5	0	0	0
XBrace14Y	XBrace4	Y-GenXY	8XY	10Y	2	5	0.791	0.582	0.582	5/8 A394	2	1	1	Short only	0.875	0	0.875	2.5	0	0	0
XBrace15P	XBrace4	XY-Symmetry	8X	10XY	2	5	0.791	0.582	0.582	5/8 A394	2	1	1	Short only	0.875	0	0.875	2.5	0	0	0
XBrace15X	XBrace4	X-GenXY	8P	10Y	2	5	0.791	0.582	0.582	5/8 A394	2	1	1	Short only	0.875	0	0.875	2.5	0	0	0
XBrace15XY	XBrace4	XY-GenXY	8Y	10S	2	5	0.791	0.582	0.582	5/8 A394	2	1	1	Short only	0.875	0	0.875	2.5	0	0	0
XBrace15Y	XBrace4	Y-GenXY	8XY	10X	2	5	0.791	0.582	0.582	5/8 A394	2	1	1	Short only	0.875	0	0.875				

																			2.5	0	0	0
XBrace16P	XBrace4	XY-Symmetry	10XY	11X	2	5	0.789	0.578	0.578	5/8	A394	2	1	1	Short only	1	0	0.875	2.125	0	0	0
XBrace16X	XBrace4	X-GenXY	10Y	11S	2	5	0.789	0.578	0.578	5/8	A394	2	1	1	Short only	1	0	0.875	2.125	0	0	0
XBrace16XY	XBrace4	XY-GenXY	10S	11Y	2	5	0.789	0.578	0.578	5/8	A394	2	1	1	Short only	1	0	0.875	2.125	0	0	0
XBrace16Y	XBrace4	Y-GenXY	10X	11XY	2	5	0.789	0.578	0.578	5/8	A394	2	1	1	Short only	1	0	0.875	2.125	0	0	0
XBrace17P	XBrace4	XY-Symmetry	10S	11X	2	5	0.789	0.578	0.578	5/8	A394	2	1	1	Short only	1	0	0.875	2.125	0	0	0
XBrace17X	XBrace4	X-GenXY	10X	11S	2	5	0.789	0.578	0.578	5/8	A394	2	1	1	Short only	1	0	0.875	2.125	0	0	0
XBrace17XY	XBrace4	XY-GenXY	10XY	11Y	2	5	0.789	0.578	0.578	5/8	A394	2	1	1	Short only	1	0	0.875	2.125	0	0	0
XBrace17Y	XBrace4	Y-GenXY	10Y	11XY	2	5	0.789	0.578	0.578	5/8	A394	2	1	1	Short only	1	0	0.875	2.125	0	0	0
XBrace18P	XBrace5	XY-Symmetry	11S	12X	2	4	0.779	0.559	0.559	5/8	A394	1	1	1	Short only	1	0	0.875	0	0	0	0
XBrace18X	XBrace5	X-GenXY	11X	12S	2	4	0.779	0.559	0.559	5/8	A394	1	1	1	Short only	1	0	0.875	0	0	0	0
XBrace18XY	XBrace5	XY-GenXY	11XY	12Y	2	4	0.779	0.559	0.559	5/8	A394	1	1	1	Short only	1	0	0.875	0	0	0	0
XBrace18Y	XBrace5	Y-GenXY	11Y	12XY	2	4	0.779	0.559	0.559	5/8	A394	1	1	1	Short only	1	0	0.875	0	0	0	0
XBrace19P	XBrace5	XY-Symmetry	11X	12XY	2	4	0.779	0.559	0.559	5/8	A394	1	1	1	Short only	1	0	0.875	0	0	0	0
XBrace19X	XBrace5	X-GenXY	11S	12Y	2	4	0.779	0.559	0.559	5/8	A394	1	1	1	Short only	1	0	0.875	0	0	0	0
XBrace19XY	XBrace5	XY-GenXY	11Y	12S	2	4	0.779	0.559	0.559	5/8	A394	1	1	1	Short only	1	0	0.875	0	0	0	0
XBrace19Y	XBrace5	Y-GenXY	11XY	12X	2	4	0.779	0.559	0.559	5/8	A394	1	1	1	Short only	1	0	0.875	0	0	0	0
XBrace20P	XBrace6	XY-Symmetry	12S	13X	2	4	0.772	0.544	0.544	5/8	A394	1	1	1	Short only	1.375	0	0.875	0	0	0	0
XBrace20X	XBrace6	X-GenXY	12X	13S	2	4	0.772	0.544	0.544	5/8	A394	1	1	1	Short only	1.375	0	0.875	0	0	0	0
XBrace20XY	XBrace6	XY-GenXY	12XY	13Y	2	4	0.772	0.544	0.544	5/8	A394	1	1	1	Short only	1.375	0	0.875	0	0	0	0
XBrace20Y	XBrace6	Y-GenXY	12Y	13XY	2	4	0.772	0.544	0.544	5/8	A394	1	1	1	Short only	1.375	0	0.875	0	0	0	0
XBrace21P	XBrace6	XY-Symmetry	12X	13XY	2	4	0.772	0.544	0.544	5/8	A394	1	1	1	Short only	1.375	0	0.875	0	0	0	0
XBrace21X	XBrace6	X-GenXY	12S	13Y	2	4	0.772	0.544	0.544	5/8	A394	1	1	1	Short only	1.375	0	0.875	0	0	0	0
XBrace21XY	XBrace6	XY-GenXY	12Y	13S	2	4	0.772	0.544	0.544	5/8	A394	1	1	1	Short only	1.375	0	0.875	0	0	0	0
XBrace21Y	XBrace6	Y-GenXY	12XY	13X	2	4	0.772	0.544	0.544	5/8	A394	1	1	1	Short only	1.375	0	0.875	0	0	0	0
XBrace22P	XBrace7	XY-Symmetry	13S	14X	2	4	0.771	0.543	0.543	5/8	A394	1	1	1	Short only	1.625	0	0.875	0	0	0	0
XBrace22X	XBrace7	X-GenXY	13X	14S	2	4	0.771	0.543	0.543	5/8	A394	1	1	1	Short only	1.625	0	0.875	0	0	0	0
XBrace22XY	XBrace7	XY-GenXY	13XY	14Y	2	4	0.771	0.543	0.543	5/8	A394	1	1	1	Short only	1.625	0	0.875	0	0	0	0
XBrace22Y	XBrace7	Y-GenXY	13Y	14XY	2	4	0.771	0.543	0.543	5/8	A394	1	1	1	Short only	1.625	0	0.875	0	0	0	0
XBrace23P	XBrace7	XY-Symmetry	13X	14XY	2	4	0.771	0.543	0.543	5/8	A394	1	1	1	Short only	1.625	0	0.875	0	0	0	0

XBrace23X	XBrace7	X-GenXY	13S	14Y	2	4	0.771	0.543	0.543	5/8	A394	1	1	1	Short only	1.625	0	0.875	0	0	0	0
XBrace23XY	XBrace7	XY-GenXY	13Y	14S	2	4	0.771	0.543	0.543	5/8	A394	1	1	1	Short only	1.625	0	0.875	0	0	0	0
XBrace23Y	XBrace7	Y-GenXY	13XY	14X	2	4	0.771	0.543	0.543	5/8	A394	1	1	1	Short only	1.625	0	0.875	0	0	0	0
XBrace24P	XBrace8	XY-Symmetry	14X	9P	2	5	0.577	0.788	0.577	5/8	A394	2	1	1	Long only	0.875	0	0.875	2.4375	0	0	0
XBrace24X	XBrace8	X-GenXY	14S	9X	2	5	0.577	0.788	0.577	5/8	A394	2	1	1	Long only	0.875	0	0.875	2.4375	0	0	0
XBrace24XY	XBrace8	XY-GenXY	14Y	9XY	2	5	0.577	0.788	0.577	5/8	A394	2	1	1	Long only	0.875	0	0.875	2.4375	0	0	0
XBrace24Y	XBrace8	Y-GenXY	14XY	9Y	2	5	0.577	0.788	0.577	5/8	A394	2	1	1	Long only	0.875	0	0.875	2.4375	0	0	0
XBrace25P	XBrace8	XY-Symmetry	14XY	9X	2	5	0.577	0.788	0.577	5/8	A394	2	1	1	Long only	0.875	0	0.875	2.4375	0	0	0
XBrace25X	XBrace8	X-GenXY	14Y	9P	2	5	0.577	0.788	0.577	5/8	A394	2	1	1	Long only	0.875	0	0.875	2.4375	0	0	0
XBrace25XY	XBrace8	XY-GenXY	14S	9Y	2	5	0.577	0.788	0.577	5/8	A394	2	1	1	Long only	0.875	0	0.875	2.4375	0	0	0
XBrace25Y	XBrace8	Y-GenXY	14X	9XY	2	5	0.577	0.788	0.577	5/8	A394	2	1	1	Long only	0.875	0	0.875	2.4375	0	0	0
Horz1P	Horz1	X-Symmetry	2X	2XY	3	4	1	1	1	5/8	A394	1	1	1	Short only	1	0	0.875	0	0	0	0
Horz1X	Horz1	X-Gen	2P	2Y	3	4	1	1	1	5/8	A394	1	1	1	Short only	1	0	0.875	0	0	0	0
Horz2P	Horz1	X-Symmetry	5X	5XY	3	4	1	1	1	5/8	A394	1	1	1	Short only	1	0	0.875	0	0	0	0
Horz2X	Horz1	X-Gen	5S	5Y	3	4	1	1	1	5/8	A394	1	1	1	Short only	1	0	0.875	0	0	0	0
Horz3P	Horz3	X-Symmetry	7X	7XY	3	4	1	1	1	5/8	A394	1	1	1	Short only	1	0	0.875	0	0	0	0
Horz3X	Horz3	X-Gen	7P	7Y	3	4	1	1	1	5/8	A394	1	1	1	Short only	1	0	0.875	0	0	0	0
Horz4P	Horz1	X-Symmetry	8X	8XY	3	4	1	1	1	5/8	A394	1	1	1	Short only	0.75	0	2.1875	0	0	0	0
Horz4X	Horz1	X-Gen	8P	8Y	3	4	1	1	1	5/8	A394	1	1	1	Short only	0.75	0	2.1875	0	0	0	0
Horz5P	Horz1	Y-Symmetry	8P	8X	3	4	1	1	1	5/8	A394	1	1	1	Short only	0.875	0	0.875	0	0	0	0
Horz5Y	Horz1	Y-Gen	8Y	8XY	3	4	1	1	1	5/8	A394	1	1	1	Short only	0.875	0	0.875	0	0	0	0
Horz6P	Horz2	Y-Symmetry	14S	14X	3	4	1	0.5	0.5	5/8	A394	1	1	1	Short only	0.875	0	0.875	0	0	0	0
Horz6Y	Horz2	Y-Gen	14Y	14XY	3	4	1	0.5	0.5	5/8	A394	1	1	1	Short only	0.875	0	0.875	0	0	0	0
Horz7P	Horz2	X-Symmetry	14X	14XY	3	4	1	0.5	0.5	5/8	A394	1	1	1	Short only	0.875	0	0.875	0	0	0	0
Horz7X	Horz2	X-Gen	14S	14Y	3	4	1	0.5	0.5	5/8	A394	1	1	1	Short only	0.875	0	0.875	0	0	0	0
Arm1P	Arm1	X-Symmetry	15P	1P	3	4	1	1	1	5/8	A394	1	4	1	Short only	0.875	0	0	0	0	0	0
Arm1X	Arm1	X-Gen	15X	1X	3	4	1	1	1	5/8	A394	1	4	1	Short only	0.875	0	0	0	0	0	0
Arm2P	Arm1	None	1P	1X	3	4	1	1	1	5/8	A394	1	4	1	Short only	0.875	0	0	0	0	0	0
Arm3P	Arm2	XY-Symmetry	16P	2P	3	5	1	0.5	0.5	5/8	A394	1	1	1	Short only	1.25	0	2.375	0	0	0	0
Arm3X	Arm2	X-GenXY	16X	2X	3	5	1	0.5	0.5	5/8	A394	1	1	1	Short only	1.25	0	2.375				

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Arm3XY	Arm2	XY-GenXY	16X	2XY	3	5	1	0.5	0.5	5/8	A394	1	1	1	Short only	1.25	0	2.375	0	0	0	0
Arm3Y	Arm2	Y-GenXY	16P	2Y	3	5	1	0.5	0.5	5/8	A394	1	1	1	Short only	1.25	0	2.375	0	0	0	0
Arm4P	Arm2	Y-Symmetry	2P	2X	3	5	1	1	1	5/8	A394	1	1	1	Short only	1.25	0	2.375	0	0	0	0
Arm4Y	Arm2	Y-Gen	2Y	2XY	3	5	1	1	1	5/8	A394	1	1	1	Short only	1.25	0	2.375	0	0	0	0
Arm5P	Arm3	XY-Symmetry	17P	5S	3	5	1	0.5	0.5	5/8	A394	2	1.65	1	Long only	0.875	2.5	2.375	2.5	0	0	0
Arm5X	Arm3	X-GenXY	17X	5X	3	5	1	0.5	0.5	5/8	A394	2	1.65	1	Long only	0.875	2.5	2.375	2.5	0	0	0
Arm5XY	Arm3	XY-GenXY	17X	5XY	3	5	1	0.5	0.5	5/8	A394	2	1.65	1	Long only	0.875	2.5	2.375	2.5	0	0	0
Arm5Y	Arm3	Y-GenXY	17P	5Y	3	5	1	0.5	0.5	5/8	A394	2	1.65	1	Long only	0.875	2.5	2.375	2.5	0	0	0
Arm6P	Arm3	Y-Symmetry	5S	5X	3	5	1	1	1	5/8	A394	2	1.65	1	Long only	0.875	2.5	2.375	2.5	0	0	0
Arm6Y	Arm3	Y-Gen	5Y	5XY	3	5	1	1	1	5/8	A394	2	1.65	1	Long only	0.875	2.5	2.375	2.5	0	0	0
Arm7P	Arm2	XY-Symmetry	18P	7P	3	5	1	0.5	0.5	5/8	A394	2	1	1	Short only	1.375	0	2.1875	6	0	0	0
Arm7X	Arm2	X-GenXY	18X	7X	3	5	1	0.5	0.5	5/8	A394	2	1	1	Short only	1.375	0	2.1875	6	0	0	0
Arm7XY	Arm2	XY-GenXY	18X	7XY	3	5	1	0.5	0.5	5/8	A394	2	1	1	Short only	1.375	0	2.1875	6	0	0	0
Arm7Y	Arm2	Y-GenXY	18P	7Y	3	5	1	0.5	0.5	5/8	A394	2	1	1	Short only	1.375	0	2.1875	6	0	0	0
Arm8P	Arm2	Y-Symmetry	7P	7X	3	5	1	1	1	5/8	A394	2	1	1	Short only	1.375	0	2.1875	6	0	0	0
Arm8Y	Arm2	Y-Gen	7Y	7XY	3	5	1	1	1	5/8	A394	2	1	1	Short only	1.375	0	2.1875	6	0	0	0
Diagonal 1P	Diag1	XY-Symmetry	15P	2P	2	4	1	0.5	0.5	5/8	A394	3	1.55	1	Long only	1	2.25	0.875	2.75	0	0	0
Diagonal 1X	Diag1	X-GenXY	15X	2X	2	4	1	0.5	0.5	5/8	A394	3	1.55	1	Long only	1	2.25	0.875	2.75	0	0	0
Diagonal 1XY	Diag1	XY-GenXY	15X	2XY	2	4	1	0.5	0.5	5/8	A394	3	1.55	1	Long only	1	2.25	0.875	2.75	0	0	0
Diagonal 1Y	Diag1	Y-GenXY	15P	2Y	2	4	1	0.5	0.5	5/8	A394	3	1.55	1	Long only	1	2.25	0.875	2.75	0	0	0
Diagonal 2P	Diag2	X-Symmetry	16P	1P	2	4	1	1	1	5/8	A394	1	1	1	Long only	1	0	1	0	0	0	0
Diagonal 2X	Diag2	X-Gen	16X	1X	2	4	1	1	1	5/8	A394	1	1	1	Long only	1	0	1	0	0	0	0
Diagonal 3P	Diag2	XY-Symmetry	18P	6S	2	4	1	1	1	5/8	A394	1	1	1	Long only	1	0	1	0	0	0	0
Diagonal 3X	Diag2	X-GenXY	18X	6X	2	4	1	1	1	5/8	A394	1	1	1	Long only	1	0	1	0	0	0	0
Diagonal 3XY	Diag2	XY-GenXY	18X	6XY	2	4	1	1	1	5/8	A394	1	1	1	Long only	1	0	1	0	0	0	0
Diagonal 3Y	Diag2	Y-GenXY	18P	6Y	2	4	1	1	1	5/8	A394	1	1	1	Long only	1	0	1	0	0	0	0
Diagonal 4P	Diag3	Y-Symmetry	6S	6X	2	4	1	1	1	5/8	A394	1	1	1	Long only	1	0	1	0	0	0	0
Diagonal 4Y	Diag3	Y-Gen	6Y	6XY	2	4	1	1	1	5/8	A394	1	1	1	Long only	1	0	1	0	0	0	0
Diagonal 5P	Diag2	XY-Symmetry	17P	19X	2	4	1	1	1	5/8	A394	1	1	1	Long only	1	0	1	0	0	0	0

Diagonal 5X	Diag2	X-GenXY	17X	19P	2	4	1	1	1	5/8	A394	1	1	1	Long only	1	0	1	0	0	0	0
Diagonal 5XY	Diag2	XY-GenXY	17X	19Y	2	4	1	1	1	5/8	A394	1	1	1	Long only	1	0	1	0	0	0	0
Diagonal 5Y	Diag2	Y-GenXY	17P	19XY	2	4	1	1	1	5/8	A394	1	1	1	Long only	1	0	1	0	0	0	0
Diagonal 6P	Diag3	Y-Symmetry	4S	4X	2	4	1	1	1	5/8	A394	1	1	1	Long only	1	0	1	0	0	0	0
Diagonal 6Y	Diag3	Y-Gen	4Y	4XY	2	4	1	1	1	5/8	A394	1	1	1	Long only	1	0	1	0	0	0	0
g60P	Inner1	X-Symmetry	2P	2XY	3	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.875	0	0	0	0
g60X	Inner1	X-Gen	2X	2Y	3	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.875	0	0	0	0
g61P	Inner1	X-Symmetry	5S	5XY	3	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.875	0	0	0	0
g61X	Inner1	X-Gen	5X	5Y	3	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.875	0	0	0	0
g62P	Inner1	X-Symmetry	7P	7XY	3	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.875	0	0	0	0
g62X	Inner1	X-Gen	7X	7Y	3	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.875	0	0	0	0
g63P	Inner1	X-Symmetry	8P	8XY	3	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.875	0	0	0	0
g63X	Inner1	X-Gen	8X	8Y	3	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.75	0	0.875	0	0	0	0
g64P	Inner2	X-Symmetry	14S	14XY	3	4	0.5	0.75	0.5	5/8	A394	1	1	1	Long only	1	0	0.875	0	0	0	0
g64X	Inner2	X-Gen	14X	14Y	3	4	0.5	0.75	0.5	5/8	A394	1	1	1	Long only	1	0	0.875	0	0	0	0
Diagonal 7P	Diag2	XY-Symmetry	19X	4S	2	4	1	1	1	5/8	A394	1	1	1	Long only	1	0	1	0	0	0	0
Diagonal 7X	Diag2	X-GenXY	19P	4X	2	4	1	1	1	5/8	A394	1	1	1	Long only	1	0	1	0	0	0	0
Diagonal 7XY	Diag2	XY-GenXY	19Y	4XY	2	4	1	1	1	5/8	A394	1	1	1	Long only	1	0	1	0	0	0	0
Diagonal 7Y	Diag2	Y-GenXY	19XY	4Y	2	4	1	1	1	5/8	A394	1	1	1	Long only	1	0	1	0	0	0	0
Diagonal 8P	Diag2	XY-Symmetry	19X	5S	2	4	1	1	1	5/8	A394	1	1	1	Long only	1	0	1	0	0	0	0
Diagonal 8X	Diag2	X-GenXY	19P	5X	2	4	1	1	1	5/8	A394	1	1	1	Long only	1	0	1	0	0	0	0
Diagonal 8XY	Diag2	XY-GenXY	19Y	5XY	2	4	1	1	1	5/8	A394	1	1	1	Long only	1	0	1	0	0	0	0
Diagonal 8Y	Diag2	Y-GenXY	19XY	5Y	2	4	1	1	1	5/8	A394	1	1	1	Long only	1	0	1	0	0	0	0

Member Capacities and Overrides:

Member Group Design Comp. Design Tension L/r Length L/r Connection Connection Net Rupture RTE End RTE Edge Override Override Override Override Override Override Warnings
Label Label Comp. Control Tension Control Comp. Shear Bearing Section Tension Dist. Dist. Comp. Comp. Comp. Tension Tension Face or Errors
Capacity Criterion Capacity Criterion Capacity Capacity Capacity Tension Capacity Tension Tension Capacity Capacity Control Capacity Control Member
Capacity Capacity Capacity
Unsup. Criterion Criterion ship

		(kips)		(kips)			(ft)	(kips)	(kips)	(kips)	(kips)	(kips)	(kips)	(kips)	(kips)	(kips)	(kips)		
Leg1P	Leg1	10.122	L/r	16.406	Rupture	151	5.39	10.122	18.200	21.094	17.444	16.406	0.000	0.000	0.000	0.000	0.000	Automatic	
Leg1X	Leg1	10.122	L/r	16.406	Rupture	151	5.39	10.122	18.200	21.094	17.444	16.406	0.000	0.000	0.000	0.000	0.000	Automatic	
Leg1XY	Leg1	10.122	L/r	16.406	Rupture	151	5.39	10.122	18.200	21.094	17.444	16.406	0.000	0.000	0.000	0.000	0.000	Automatic	
Leg1Y	Leg1	10.122	L/r	16.406	Rupture	151	5.39	10.122	18.200	21.094	17.444	16.406	0.000	0.000	0.000	0.000	0.000	Automatic	
Leg2P	Leg2	72.764	L/r	61.475	Net Sect	53	3.50	72.764	0.000	0.000	61.475	0.000	0.000	0.000	0.000	0.000	0.000	Automatic	
Leg2X	Leg2	72.764	L/r	61.475	Net Sect	53	3.50	72.764	0.000	0.000	61.475	0.000	0.000	0.000	0.000	0.000	0.000	Automatic	
Leg2XY	Leg2	72.764	L/r	61.475	Net Sect	53	3.50	72.764	0.000	0.000	61.475	0.000	0.000	0.000	0.000	0.000	0.000	Automatic	
Leg2Y	Leg2	72.764	L/r	61.475	Net Sect	53	3.50	72.764	0.000	0.000	61.475	0.000	0.000	0.000	0.000	0.000	0.000	Automatic	
Leg3P	Leg2	72.764	L/r	61.475	Net Sect	53	3.50	72.764	0.000	0.000	61.475	0.000	0.000	0.000	0.000	0.000	0.000	Automatic	
Leg3X	Leg2	72.764	L/r	61.475	Net Sect	53	3.50	72.764	0.000	0.000	61.475	0.000	0.000	0.000	0.000	0.000	0.000	Automatic	
Leg3XY	Leg2	72.764	L/r	61.475	Net Sect	53	3.50	72.764	0.000	0.000	61.475	0.000	0.000	0.000	0.000	0.000	0.000	Automatic	
Leg3Y	Leg2	72.764	L/r	61.475	Net Sect	53	3.50	72.764	0.000	0.000	61.475	0.000	0.000	0.000	0.000	0.000	0.000	Automatic	
Leg4P	Leg2	72.764	L/r	61.475	Net Sect	53	3.50	72.764	0.000	0.000	61.475	0.000	0.000	0.000	0.000	0.000	0.000	Automatic	
Leg4X	Leg2	72.764	L/r	61.475	Net Sect	53	3.50	72.764	0.000	0.000	61.475	0.000	0.000	0.000	0.000	0.000	0.000	Automatic	
Leg4XY	Leg2	72.764	L/r	61.475	Net Sect	53	3.50	72.764	0.000	0.000	61.475	0.000	0.000	0.000	0.000	0.000	0.000	Automatic	
Leg4Y	Leg2	72.764	L/r	61.475	Net Sect	53	3.50	72.764	0.000	0.000	61.475	0.000	0.000	0.000	0.000	0.000	0.000	Automatic	
Leg5P	Leg2	69.710	L/r	61.475	Net Sect	64	4.25	69.710	0.000	0.000	61.475	0.000	0.000	0.000	0.000	0.000	0.000	Automatic	
Leg5X	Leg2	69.710	L/r	61.475	Net Sect	64	4.25	69.710	0.000	0.000	61.475	0.000	0.000	0.000	0.000	0.000	0.000	Automatic	
Leg5XY	Leg2	69.710	L/r	61.475	Net Sect	64	4.25	69.710	0.000	0.000	61.475	0.000	0.000	0.000	0.000	0.000	0.000	Automatic	
Leg5Y	Leg2	69.710	L/r	61.475	Net Sect	64	4.25	69.710	0.000	0.000	61.475	0.000	0.000	0.000	0.000	0.000	0.000	Automatic	
Leg6P	**Leg2**	**69.710**	**L/r**	**61.546**	**Net Sect**	**64**	**4.25**	**69.710**	**109.200**	**105.469**	**61.546**	**93.750**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**Automatic**	**Member "Leg6P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??**
Leg6X	**Leg2**	**69.710**	**L/r**	**61.546**	**Net Sect**	**64**	**4.25**	**69.710**	**109.200**	**105.469**	**61.546**	**93.750**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**Automatic**	**Member "Leg6X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??**
Leg6XY	**Leg2**	**69.710**	**L/r**	**61.546**	**Net Sect**	**64**	**4.25**	**69.710**	**109.200**	**105.469**	**61.546**	**93.750**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**Automatic**	**Member "Leg6XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??**
Leg6Y	**Leg2**	**69.710**	**L/r**	**61.546**	**Net Sect**	**64**	**4.25**	**69.710**	**109.200**	**105.469**	**61.546**	**93.750**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**Automatic**	**Member "Leg6Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??**
Leg7P	Leg3	95.941	L/r	83.423	Net Sect	65	4.25	95.941	0.000	0.000	83.423	0.000	0.000	0.000	0.000	0.000	0.000	Automatic	

Leg7X	Leg3	95.941	L/r	83.423	Net Sect	65	4.25	95.941	0.000	0.000	83.423	0.000	0.000	0.000	0.000	0.000	0.000	Automatic	
Leg7XY	Leg3	95.941	L/r	83.423	Net Sect	65	4.25	95.941	0.000	0.000	83.423	0.000	0.000	0.000	0.000	0.000	0.000	Automatic	
Leg7Y	Leg3	95.941	L/r	83.423	Net Sect	65	4.25	95.941	0.000	0.000	83.423	0.000	0.000	0.000	0.000	0.000	0.000	Automatic	
Leg8P	Leg3	81.387	L/r	83.423	Net Sect	94	6.15	81.387	0.000	0.000	83.423	0.000	0.000	0.000	0.000	0.000	0.000	Automatic	
Leg8X	Leg3	81.387	L/r	83.423	Net Sect	94	6.15	81.387	0.000	0.000	83.423	0.000	0.000	0.000	0.000	0.000	0.000	Automatic	
Leg8XY	Leg3	81.387	L/r	83.423	Net Sect	94	6.15	81.387	0.000	0.000	83.423	0.000	0.000	0.000	0.000	0.000	0.000	Automatic	
Leg8Y	Leg3	81.387	L/r	83.423	Net Sect	94	6.15	81.387	0.000	0.000	83.423	0.000	0.000	0.000	0.000	0.000	0.000	Automatic	
Leg9P	Leg3	76.554	L/r	83.423	Net Sect	102	6.66	76.554	0.000	0.000	83.423	0.000	0.000	0.000	0.000	0.000	0.000	Automatic	
Leg9X	Leg3	76.554	L/r	83.423	Net Sect	102	6.66	76.554	0.000	0.000	83.423	0.000	0.000	0.000	0.000	0.000	0.000	Automatic	
Leg9XY	Leg3	76.554	L/r	83.423	Net Sect	102	6.66	76.554	0.000	0.000	83.423	0.000	0.000	0.000	0.000	0.000	0.000	Automatic	
Leg9Y	Leg3	76.554	L/r	83.423	Net Sect	102	6.66	76.554	0.000	0.000	83.423	0.000	0.000	0.000	0.000	0.000	0.000	Automatic	
Leg10P	Leg3	76.554	L/r	83.423	Net Sect	102	6.66	76.554	0.000	0.000	83.423	0.000	0.000	0.000	0.000	0.000	0.000	Automatic	
Leg10X	Leg3	76.554	L/r	83.423	Net Sect	102	6.66	76.554	0.000	0.000	83.423	0.000	0.000	0.000	0.000	0.000	0.000	Automatic	
Leg10XY	Leg3	76.554	L/r	83.423	Net Sect	102	6.66	76.554	0.000	0.000	83.423	0.000	0.000	0.000	0.000	0.000	0.000	Automatic	
Leg10Y	Leg3	76.554	L/r	83.423	Net Sect	102	6.66	76.554	0.000	0.000	83.423	0.000	0.000	0.000	0.000	0.000	0.000	Automatic	
Leg11P	**Leg3**	**72.800**	**Shear**	**72.800**	**Shear**	**97**	**6.33**	**79.787**	**72.800**	**196.875**	**74.986**	**180.147**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**Automatic**	**Member "Leg11P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??**
Leg11X	**Leg3**	**72.800**	**Shear**	**72.800**	**Shear**	**97**	**6.33**	**79.787**	**72.800**	**196.875**	**74.986**	**180.147**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**Automatic**	**Member "Leg11X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??**
Leg11XY	**Leg3**	**72.800**	**Shear**	**72.800**	**Shear**	**97**	**6.33**	**79.787**	**72.800**	**196.875**	**74.986**	**180.147**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**Automatic**	**Member "Leg11XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??**
Leg11Y	**Leg3**	**72.800**	**Shear**	**72.800**	**Shear**	**97**	**6.33**	**79.787**	**72.800**	**196.875**	**74.986**	**180.147**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**Automatic**	**Member "Leg11Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??**
Leg12P	Leg4	90.635	L/r	85.524	Net Sect	91	7.52	90.635	0.000	0.000	85.524	0.000	0.000	0.000	0.000	0.000	0.000	Automatic	
Leg12X	Leg4	90.635	L/r	85.524	Net Sect	91	7.52	90.635	0.000	0.000	85.524	0.000	0.000	0.000	0.000	0.000	0.000	Automatic	
Leg12XY	Leg4	90.635	L/r	85.524	Net Sect	91	7.52	90.635	0.000	0.000	85.524	0.000	0.000	0.000	0.000	0.000	0.000	Automatic	
Leg12Y	Leg4	90.635	L/r	85.524	Net Sect	91	7.52	90.635	0.000	0.000	85.524	0.000	0.000	0.000	0.000	0.000	0.000	Automatic	
Leg13P	**Leg4**	**72.800**	**Shear**	**72.800**	**Shear**	**109**	**17.94**	**78.526**	**72.800**	**168.750**	**98.030**	**187.500**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**Automatic**	**Member "Leg13P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??**
Leg13X	**Leg4**	**72.800**	**Shear**	**72.800**	**Shear**	**109**	**17.94**	**78.526**	**72.800**	**168.750**	**98.030**	**187.500**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**Automatic**	**Member "Leg13X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??**
Leg13XY	**Leg4**	**72.800**	**Shear**	**72.800**	**Shear**	**109**	**17.94**	**78.526**	**72.800**	**168.750**	**98.030**	**187.500**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**Automatic**	**Member "Leg13XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??**

Leg13Y	**Leg4**	**72.800**	**Shear**	**72.800**	**Shear**	**109**	**17.94**	**78.526**	**72.800**	**168.750**	**98.030**	**187.500**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**Automatic**	**Member "Leg13Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??**
XBrace1P	XBrace1	9.100	Shear	6.100	Rupture	117	6.71	12.247	9.100	10.547	14.585	6.100	0.000	0.000	0.000	0.000	0.000	Automatic	
XBrace1X	XBrace1	9.100	Shear	6.100	Rupture	117	6.71	12.247	9.100	10.547	14.585	6.100	0.000	0.000	0.000	0.000	0.000	Automatic	
XBrace1XY	XBrace1	9.100	Shear	6.100	Rupture	117	6.71	12.247	9.100	10.547	14.585	6.100	0.000	0.000	0.000	0.000	0.000	Automatic	
XBrace1Y	XBrace1	9.100	Shear	6.100	Rupture	117	6.71	12.247	9.100	10.547	14.585	6.100	0.000	0.000	0.000	0.000	0.000	Automatic	
XBrace2P	XBrace1	14.594	L/r	12.850	Rupture	93	5.32	14.594	18.200	21.094	14.585	12.850	0.000	0.000	0.000	0.000	0.000	Automatic	
XBrace2X	XBrace1	14.594	L/r	12.850	Rupture	93	5.32	14.594	18.200	21.094	14.585	12.850	0.000	0.000	0.000	0.000	0.000	Automatic	
XBrace2XY	XBrace1	14.594	L/r	12.850	Rupture	93	5.32	14.594	18.200	21.094	14.585	12.850	0.000	0.000	0.000	0.000	0.000	Automatic	
XBrace2Y	XBrace1	14.594	L/r	12.850	Rupture	93	5.32	14.594	18.200	21.094	14.585	12.850	0.000	0.000	0.000	0.000	0.000	Automatic	
XBrace3P	XBrace1	14.594	L/r	12.850	Rupture	93	5.32	14.594	18.200	21.094	14.585	12.850	0.000	0.000	0.000	0.000	0.000	Automatic	
XBrace3X	XBrace1	14.594	L/r	12.850	Rupture	93	5.32	14.594	18.200	21.094	14.585	12.850	0.000	0.000	0.000	0.000	0.000	Automatic	
XBrace3XY	XBrace1	14.594	L/r	12.850	Rupture	93	5.32	14.594	18.200	21.094	14.585	12.850	0.000	0.000	0.000	0.000	0.000	Automatic	
XBrace3Y	XBrace1	14.594	L/r	12.850	Rupture	93	5.32	14.594	18.200	21.094	14.585	12.850	0.000	0.000	0.000	0.000	0.000	Automatic	
XBrace4P	XBrace1R	18.200	Shear	18.200	Shear	82	5.32	30.542	18.200	33.984	30.299	21.223	0.000	0.000	0.000	0.000	0.000	Automatic	
XBrace4X	XBrace1R	18.200	Shear	18.200	Shear	82	5.32	30.542	18.200	33.984	30.299	21.223	0.000	0.000	0.000	0.000	0.000	Automatic	
XBrace4XY	XBrace1R	18.200	Shear	18.200	Shear	82	5.32	30.542	18.200	33.984	30.299	21.223	0.000	0.000	0.000	0.000	0.000	Automatic	
XBrace4Y	XBrace1R	18.200	Shear	18.200	Shear	82	5.32	30.542	18.200	33.984	30.299	21.223	0.000	0.000	0.000	0.000	0.000	Automatic	
XBrace5P	XBrace1R	18.200	Shear	18.200	Shear	82	5.32	30.542	18.200	33.984	30.299	21.223	0.000	0.000	0.000	0.000	0.000	Automatic	
XBrace5X	XBrace1R	18.200	Shear	18.200	Shear	82	5.32	30.542	18.200	33.984	30.299	21.223	0.000	0.000	0.000	0.000	0.000	Automatic	
XBrace5XY	XBrace1R	18.200	Shear	18.200	Shear	82	5.32	30.542	18.200	33.984	30.299	21.223	0.000	0.000	0.000	0.000	0.000	Automatic	
XBrace5Y	XBrace1R	18.200	Shear	18.200	Shear	82	5.32	30.542	18.200	33.984	30.299	21.223	0.000	0.000	0.000	0.000	0.000	Automatic	
XBrace6P	XBrace1R	18.200	Shear	18.200	Shear	82	5.32	30.542	18.200	33.984	30.299	20.543	0.000	0.000	0.000	0.000	0.000	Automatic	
XBrace6X	XBrace1R	18.200	Shear	18.200	Shear	82	5.32	30.542	18.200	33.984	30.299	20.543	0.000	0.000	0.000	0.000	0.000	Automatic	
XBrace6XY	XBrace1R	18.200	Shear	18.200	Shear	82	5.32	30.542	18.200	33.984	30.299	20.543	0.000	0.000	0.000	0.000	0.000	Automatic	
XBrace6Y	XBrace1R	18.200	Shear	18.200	Shear	82	5.32	30.542	18.200	33.984	30.299	20.543	0.000	0.000	0.000	0.000	0.000	Automatic	
XBrace7P	XBrace1R	18.200	Shear	18.200	Shear	82	5.32	30.542	18.200	33.984	30.299	20.543	0.000	0.000	0.000	0.000	0.000	Automatic	
XBrace7X	XBrace1R	18.200	Shear	18.200	Shear	82	5.32	30.542	18.200	33.984	30.299	20.543	0.000	0.000	0.000	0.000	0.000	Automatic	
XBrace7XY	XBrace1R	18.200	Shear	18.200	Shear	82	5.32	30.542	18.200	33.984	30.299	20.543	0.000	0.000	0.000	0.000	0.000	Automatic	
XBrace7Y	XBrace1R	18.200	Shear	18.200	Shear	82	5.32	30.542	18.200	33.984	30.299	20.543	0.000	0.000	0.000	0.000	0.000	Automatic	

XBrace8P XBrace2 27.300 Shear 17.783 Net Sect 92 5.84 28.258 27.300 42.187 17.783 32.812 0.000 0.000 0.000
0.000 0.000 Automatic Member "XBrace8P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
XBrace8X XBrace2 27.300 Shear 17.783 Net Sect 92 5.84 28.258 27.300 42.187 17.783 32.812 0.000 0.000 0.000
0.000 0.000 Automatic Member "XBrace8X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
XBrace8XY XBrace2 27.300 Shear 17.783 Net Sect 92 5.84 28.258 27.300 42.187 17.783 32.812 0.000 0.000 0.000
0.000 0.000 Automatic Member "XBrace8XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
XBrace8Y XBrace2 27.300 Shear 17.783 Net Sect 92 5.84 28.258 27.300 42.187 17.783 32.812 0.000 0.000 0.000
0.000 0.000 Automatic Member "XBrace8Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
XBrace9P XBrace2 27.300 Shear 17.783 Net Sect 92 5.84 28.258 27.300 42.187 17.783 32.812 0.000 0.000 0.000
0.000 0.000 Automatic Member "XBrace9P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
XBrace9X XBrace2 27.300 Shear 17.783 Net Sect 92 5.84 28.258 27.300 42.187 17.783 32.812 0.000 0.000 0.000
0.000 0.000 Automatic Member "XBrace9X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
XBrace9XY XBrace2 27.300 Shear 17.783 Net Sect 92 5.84 28.258 27.300 42.187 17.783 32.812 0.000 0.000 0.000
0.000 0.000 Automatic Member "XBrace9XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
XBrace9Y XBrace2 27.300 Shear 17.783 Net Sect 92 5.84 28.258 27.300 42.187 17.783 32.812 0.000 0.000 0.000
0.000 0.000 Automatic Member "XBrace9Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
XBrace10P XBrace2 27.300 Shear 21.509 Net Sect 92 5.84 28.258 27.300 42.187 21.509 32.812 0.000 0.000 0.000
0.000 0.000 Automatic Member "XBrace10P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
XBrace10X XBrace2 27.300 Shear 21.509 Net Sect 92 5.84 28.258 27.300 42.187 21.509 32.812 0.000 0.000 0.000
0.000 0.000 Automatic Member "XBrace10X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
XBrace10XY XBrace2 27.300 Shear 21.509 Net Sect 92 5.84 28.258 27.300 42.187 21.509 32.812 0.000 0.000 0.000
0.000 0.000 Automatic Member "XBrace10XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
XBrace10Y XBrace2 27.300 Shear 21.509 Net Sect 92 5.84 28.258 27.300 42.187 21.509 32.812 0.000 0.000 0.000
0.000 0.000 Automatic Member "XBrace10Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
XBrace11P XBrace2 27.300 Shear 21.509 Net Sect 92 5.84 28.258 27.300 42.187 21.509 32.812 0.000 0.000 0.000
0.000 0.000 Automatic Member "XBrace11P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
XBrace11X XBrace2 27.300 Shear 21.509 Net Sect 92 5.84 28.258 27.300 42.187 21.509 32.812 0.000 0.000 0.000
0.000 0.000 Automatic Member "XBrace11X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
XBrace11XY XBrace2 27.300 Shear 21.509 Net Sect 92 5.84 28.258 27.300 42.187 21.509 32.812 0.000 0.000 0.000
0.000 0.000 Automatic Member "XBrace11XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
XBrace11Y XBrace2 27.300 Shear 21.509 Net Sect 92 5.84 28.258 27.300 42.187 21.509 32.812 0.000 0.000 0.000
0.000 0.000 Automatic Member "XBrace11Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
XBrace12P XBrace3 18.200 Shear 18.200 Shear 71 5.84 31.380 18.200 28.125 30.238 21.875 0.000 0.000 0.000
0.000 0.000 Automatic Member "XBrace12P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
XBrace12X XBrace3 18.200 Shear 18.200 Shear 71 5.84 31.380 18.200 28.125 30.238 21.875 0.000 0.000 0.000
0.000 0.000 Automatic Member "XBrace12X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
XBrace12XY XBrace3 18.200 Shear 18.200 Shear 71 5.84 31.380 18.200 28.125 30.238 21.875 0.000 0.000 0.000
0.000 0.000 Automatic Member "XBrace12XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
XBrace12Y XBrace3 18.200 Shear 18.200 Shear 71 5.84 31.380 18.200 28.125 30.238 21.875 0.000 0.000 0.000

																0.000	0.000	Automatic	Member "XBrace12Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
XBrace13P	XBrace3	18.200	Shear	18.200	Shear	71	5.84	31.380	18.200	28.125	30.238	21.875	0.000	0.000	0.000	0.000	0.000	Automatic	Member "XBrace13P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
XBrace13X	XBrace3	18.200	Shear	18.200	Shear	71	5.84	31.380	18.200	28.125	30.238	21.875	0.000	0.000	0.000	0.000	0.000	Automatic	Member "XBrace13X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
XBrace13XY	XBrace3	18.200	Shear	18.200	Shear	71	5.84	31.380	18.200	28.125	30.238	21.875	0.000	0.000	0.000	0.000	0.000	Automatic	Member "XBrace13XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
XBrace13Y	XBrace3	18.200	Shear	18.200	Shear	71	5.84	31.380	18.200	28.125	30.238	21.875	0.000	0.000	0.000	0.000	0.000	Automatic	Member "XBrace13Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
XBrace14P	XBrace4	14.684	L/r	18.200	Shear	140	7.84	14.684	18.200	28.125	22.813	21.875	0.000	0.000	0.000	0.000	0.000	Automatic	
XBrace14X	XBrace4	14.684	L/r	18.200	Shear	140	7.84	14.684	18.200	28.125	22.813	21.875	0.000	0.000	0.000	0.000	0.000	Automatic	
XBrace14XY	XBrace4	14.684	L/r	18.200	Shear	140	7.84	14.684	18.200	28.125	22.813	21.875	0.000	0.000	0.000	0.000	0.000	Automatic	
XBrace14Y	XBrace4	14.684	L/r	18.200	Shear	140	7.84	14.684	18.200	28.125	22.813	21.875	0.000	0.000	0.000	0.000	0.000	Automatic	
XBrace15P	XBrace4	14.684	L/r	18.200	Shear	140	7.84	14.684	18.200	28.125	22.813	21.875	0.000	0.000	0.000	0.000	0.000	Automatic	
XBrace15X	XBrace4	14.684	L/r	18.200	Shear	140	7.84	14.684	18.200	28.125	22.813	21.875	0.000	0.000	0.000	0.000	0.000	Automatic	
XBrace15XY	XBrace4	14.684	L/r	18.200	Shear	140	7.84	14.684	18.200	28.125	22.813	21.875	0.000	0.000	0.000	0.000	0.000	Automatic	
XBrace15Y	XBrace4	14.684	L/r	18.200	Shear	140	7.84	14.684	18.200	28.125	22.813	21.875	0.000	0.000	0.000	0.000	0.000	Automatic	
XBrace16P	XBrace4	10.765	L/r	18.200	Shear	170	9.58	10.765	18.200	28.125	22.813	21.875	0.000	0.000	0.000	0.000	0.000	Automatic	
XBrace16X	XBrace4	10.765	L/r	18.200	Shear	170	9.58	10.765	18.200	28.125	22.813	21.875	0.000	0.000	0.000	0.000	0.000	Automatic	
XBrace16XY	XBrace4	10.765	L/r	18.200	Shear	170	9.58	10.765	18.200	28.125	22.813	21.875	0.000	0.000	0.000	0.000	0.000	Automatic	
XBrace16Y	XBrace4	10.765	L/r	18.200	Shear	170	9.58	10.765	18.200	28.125	22.813	21.875	0.000	0.000	0.000	0.000	0.000	Automatic	
XBrace17P	XBrace4	10.765	L/r	18.200	Shear	170	9.58	10.765	18.200	28.125	22.813	21.875	0.000	0.000	0.000	0.000	0.000	Automatic	
XBrace17X	XBrace4	10.765	L/r	18.200	Shear	170	9.58	10.765	18.200	28.125	22.813	21.875	0.000	0.000	0.000	0.000	0.000	Automatic	
XBrace17XY	XBrace4	10.765	L/r	18.200	Shear	170	9.58	10.765	18.200	28.125	22.813	21.875	0.000	0.000	0.000	0.000	0.000	Automatic	
XBrace17Y	XBrace4	10.765	L/r	18.200	Shear	170	9.58	10.765	18.200	28.125	22.813	21.875	0.000	0.000	0.000	0.000	0.000	Automatic	
XBrace18P	XBrace5	5.606	L/r	7.646	Rupture	190	11.18	5.606	9.100	10.547	17.258	7.646	0.000	0.000	0.000	0.000	0.000	Automatic	
XBrace18X	XBrace5	5.606	L/r	7.646	Rupture	190	11.18	5.606	9.100	10.547	17.258	7.646	0.000	0.000	0.000	0.000	0.000	Automatic	
XBrace18XY	XBrace5	5.606	L/r	7.646	Rupture	190	11.18	5.606	9.100	10.547	17.258	7.646	0.000	0.000	0.000	0.000	0.000	Automatic	
XBrace18Y	XBrace5	5.606	L/r	7.646	Rupture	190	11.18	5.606	9.100	10.547	17.258	7.646	0.000	0.000	0.000	0.000	0.000	Automatic	
XBrace19P	XBrace5	5.606	L/r	7.646	Rupture	190	11.18	5.606	9.100	10.547	17.258	7.646	0.000	0.000	0.000	0.000	0.000	Automatic	
XBrace19X	XBrace5	5.606	L/r	7.646	Rupture	190	11.18	5.606	9.100	10.547	17.258	7.646	0.000	0.000	0.000	0.000	0.000	Automatic	
XBrace19XY	XBrace5	5.606	L/r	7.646	Rupture	190	11.18	5.606	9.100	10.547	17.258	7.646	0.000	0.000	0.000				

																0.000	0.000	Automatic
XBrace19Y	XBrace5	5.606	L/r	7.646	Rupture	190	11.18	5.606	9.100	10.547	17.258	7.646	0.000	0.000	0.000	0.000	0.000	Automatic
XBrace20P	XBrace6	9.100	Shear	8.203	Rupture	168	12.71	9.190	9.100	10.547	22.961	8.203	0.000	0.000	0.000	0.000	0.000	Automatic
XBrace20X	XBrace6	9.100	Shear	8.203	Rupture	168	12.71	9.190	9.100	10.547	22.961	8.203	0.000	0.000	0.000	0.000	0.000	Automatic
XBrace20XY	XBrace6	9.100	Shear	8.203	Rupture	168	12.71	9.190	9.100	10.547	22.961	8.203	0.000	0.000	0.000	0.000	0.000	Automatic
XBrace20Y	XBrace6	9.100	Shear	8.203	Rupture	168	12.71	9.190	9.100	10.547	22.961	8.203	0.000	0.000	0.000	0.000	0.000	Automatic
XBrace21P	XBrace6	9.100	Shear	8.203	Rupture	168	12.71	9.190	9.100	10.547	22.961	8.203	0.000	0.000	0.000	0.000	0.000	Automatic
XBrace21X	XBrace6	9.100	Shear	8.203	Rupture	168	12.71	9.190	9.100	10.547	22.961	8.203	0.000	0.000	0.000	0.000	0.000	Automatic
XBrace21XY	XBrace6	9.100	Shear	8.203	Rupture	168	12.71	9.190	9.100	10.547	22.961	8.203	0.000	0.000	0.000	0.000	0.000	Automatic
XBrace21Y	XBrace6	9.100	Shear	8.203	Rupture	168	12.71	9.190	9.100	10.547	22.961	8.203	0.000	0.000	0.000	0.000	0.000	Automatic
XBrace22P	XBrace7	9.100	Shear	9.100	Shear	167	15.17	14.787	9.100	14.062	37.663	10.937	0.000	0.000	0.000	0.000	0.000	Automatic
XBrace22X	XBrace7	9.100	Shear	9.100	Shear	167	15.17	14.787	9.100	14.062	37.663	10.937	0.000	0.000	0.000	0.000	0.000	Automatic
XBrace22XY	XBrace7	9.100	Shear	9.100	Shear	167	15.17	14.787	9.100	14.062	37.663	10.937	0.000	0.000	0.000	0.000	0.000	Automatic
XBrace22Y	XBrace7	9.100	Shear	9.100	Shear	167	15.17	14.787	9.100	14.062	37.663	10.937	0.000	0.000	0.000	0.000	0.000	Automatic
XBrace23P	XBrace7	9.100	Shear	9.100	Shear	167	15.17	14.787	9.100	14.062	37.663	10.937	0.000	0.000	0.000	0.000	0.000	Automatic
XBrace23X	XBrace7	9.100	Shear	9.100	Shear	167	15.17	14.787	9.100	14.062	37.663	10.937	0.000	0.000	0.000	0.000	0.000	Automatic
XBrace23XY	XBrace7	9.100	Shear	9.100	Shear	167	15.17	14.787	9.100	14.062	37.663	10.937	0.000	0.000	0.000	0.000	0.000	Automatic
XBrace23Y	XBrace7	9.100	Shear	9.100	Shear	167	15.17	14.787	9.100	14.062	37.663	10.937	0.000	0.000	0.000	0.000	0.000	Automatic
XBrace24P	XBrace8	0.945	L/r	14.585	Net Sect	531	24.70	0.945	18.200	21.094	14.585	16.406	0.000	0.000	0.000	0.000	0.000	Automatic
XBrace24X	XBrace8	0.945	L/r	14.585	Net Sect	531	24.70	0.945	18.200	21.094	14.585	16.406	0.000	0.000	0.000	0.000	0.000	Automatic
XBrace24XY	XBrace8	0.945	L/r	14.585	Net Sect	531	24.70	0.945	18.200	21.094	14.585	16.406	0.000	0.000	0.000	0.000	0.000	Automatic
XBrace24Y	XBrace8	0.945	L/r	14.585	Net Sect	531	24.70	0.945	18.200	21.094	14.585	16.406	0.000	0.000	0.000	0.000	0.000	Automatic
XBrace25P	XBrace8	0.945	L/r	14.585	Net Sect	531	24.70	0.945	18.200	21.094	14.585	16.406	0.000	0.000	0.000	0.000	0.000	Automatic
XBrace25X	XBrace8	0.945	L/r	14.585	Net Sect	531	24.70	0.945	18.200	21.094	14.585	16.406	0.000	0.000	0.000	0.000	0.000	Automatic
XBrace25XY	XBrace8	0.945	L/r	14.585	Net Sect	531	24.70	0.945	18.200	21.094	14.585	16.406	0.000	0.000	0.000	0.000	0.000	Automatic
XBrace25Y	XBrace8	0.945	L/r	14.585	Net Sect	531	24.70	0.945	18.200	21.094	14.585	16.406	0.000	0.000	0.000	0.000	0.000	Automatic
Horz1P	Horz1	9.100	Shear	7.646	Rupture	122	4.00	13.406	9.100	10.547	17.258	7.646	0.000	0.000	0.000	0.000	0.000	Automatic
Horz1X	Horz1	9.100	Shear	7.646	Rupture	122	4.00	13.406	9.100	10.547	17.258	7.646	0.000	0.000	0.000	0.000	0.000	Automatic
Horz2P	Horz1	9.100	Shear	7.646	Rupture	122	4.00	13.406	9.100	10.547	17.258	7.646	0.000	0.000	0.000	0.000	0.000	Automatic
Horz2X	Horz1	9.100	Shear	7.646	Rupture	122	4.00	13.406	9.100	10.547	17.258	7.646	0.000	0.000	0.000	0.000	0.000	Automatic

Horz3P	Horz3	9.100	Shear	9.100	Shear	123	4.00	17.545	9.100	14.062	22.813	10.195	0.000	0.000	0.000	0.000	0.000	Automatic	
Horz3X	Horz3	9.100	Shear	9.100	Shear	123	4.00	17.545	9.100	14.062	22.813	10.195	0.000	0.000	0.000	0.000	0.000	Automatic	
Horz4P	Horz1	9.100	Shear	8.272	Rupture	122	4.00	13.406	9.100	10.547	17.258	8.272	0.000	0.000	0.000	0.000	0.000	Automatic	
Horz4X	Horz1	9.100	Shear	8.272	Rupture	122	4.00	13.406	9.100	10.547	17.258	8.272	0.000	0.000	0.000	0.000	0.000	Automatic	
Horz5P	Horz1	9.100	Shear	6.873	Rupture	122	4.00	13.406	9.100	10.547	17.258	6.873	0.000	0.000	0.000	0.000	0.000	Automatic	
Horz5Y	Horz1	9.100	Shear	6.873	Rupture	122	4.00	13.406	9.100	10.547	17.258	6.873	0.000	0.000	0.000	0.000	0.000	Automatic	
Horz6P	Horz2	9.100	Shear	9.100	Shear	183	14.40	11.214	9.100	14.062	30.090	9.164	0.000	0.000	0.000	0.000	0.000	Automatic	
Horz6Y	Horz2	9.100	Shear	9.100	Shear	183	14.40	11.214	9.100	14.062	30.090	9.164	0.000	0.000	0.000	0.000	0.000	Automatic	
Horz7P	Horz2	9.100	Shear	9.100	Shear	183	14.40	11.214	9.100	14.062	30.090	9.164	0.000	0.000	0.000	0.000	0.000	Automatic	
Horz7X	Horz2	9.100	Shear	9.100	Shear	183	14.40	11.214	9.100	14.062	30.090	9.164	0.000	0.000	0.000	0.000	0.000	Automatic	
Arm1P	Arm1	9.100	Shear	9.100	Shear	182	12.00	14.062	9.100	21.094	27.231	17.121	0.000	0.000	0.000	0.000	0.000	Automatic	
Arm1X	Arm1	9.100	Shear	9.100	Shear	182	12.00	14.062	9.100	21.094	27.231	17.121	0.000	0.000	0.000	0.000	0.000	Automatic	
Arm2P	Arm1	9.100	Shear	9.100	Shear	61	4.00	40.905	9.100	21.094	27.231	17.121	0.000	0.000	0.000	0.000	0.000	Automatic	
Arm3P	Arm2	9.100	Shear	9.100	Shear	129	8.25	21.113	9.100	14.062	30.238	18.382	0.000	0.000	0.000	0.000	0.000	Automatic	
Arm3X	Arm2	9.100	Shear	9.100	Shear	129	8.25	21.113	9.100	14.062	30.238	18.382	0.000	0.000	0.000	0.000	0.000	Automatic	
Arm3XY	Arm2	9.100	Shear	9.100	Shear	129	8.25	21.113	9.100	14.062	30.238	18.382	0.000	0.000	0.000	0.000	0.000	Automatic	
Arm3Y	Arm2	9.100	Shear	9.100	Shear	129	8.25	21.113	9.100	14.062	30.238	18.382	0.000	0.000	0.000	0.000	0.000	Automatic	
Arm4P	Arm2	9.100	Shear	9.100	Shear	98	4.00	25.851	9.100	14.062	30.238	18.382	0.000	0.000	0.000	0.000	0.000	Automatic	
Arm4Y	Arm2	9.100	Shear	9.100	Shear	98	4.00	25.851	9.100	14.062	30.238	18.382	0.000	0.000	0.000	0.000	0.000	Automatic	
Arm5P	**Arm3**	**18.200**	**Shear**	**18.200**	**Shear**	**134**	**12.17**	**24.070**	**18.200**	**28.125**	**34.345**	**25.735**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**Automatic**	**Member "Arm5P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??**
Arm5X	**Arm3**	**18.200**	**Shear**	**18.200**	**Shear**	**134**	**12.17**	**24.070**	**18.200**	**28.125**	**34.345**	**25.735**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**Automatic**	**Member "Arm5X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??**
Arm5XY	**Arm3**	**18.200**	**Shear**	**18.200**	**Shear**	**134**	**12.17**	**24.070**	**18.200**	**28.125**	**34.345**	**25.735**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**Automatic**	**Member "Arm5XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??**
Arm5Y	**Arm3**	**18.200**	**Shear**	**18.200**	**Shear**	**134**	**12.17**	**24.070**	**18.200**	**28.125**	**34.345**	**25.735**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**Automatic**	**Member "Arm5Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??**
Arm6P	**Arm3**	**18.200**	**Shear**	**18.200**	**Shear**	**88**	**4.00**	**32.671**	**18.200**	**28.125**	**34.345**	**25.735**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**Automatic**	**Member "Arm6P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??**
Arm6Y	**Arm3**	**18.200**	**Shear**	**18.200**	**Shear**	**88**	**4.00**	**32.671**	**18.200**	**28.125**	**34.345**	**25.735**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**Automatic**	**Member "Arm6Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??**
Arm7P	Arm2	18.200	Shear	18.200	Shear	129	8.25	21.113	18.200	28.125	30.238	40.441	0.000	0.000	0.000	0.000	0.000	Automatic	
Arm7X	Arm2	18.200	Shear	18.200	Shear	129	8.25	21.113	18.200	28.125	30.238	40.441	0.000	0.000	0.000				

0.000 0.000 Automatic
Arm7XY Arm2 18.200 Shear 18.200 Shear 129 8.25 21.113 18.200 28.125 30.238 40.441 0.000 0.000 0.000
0.000 0.000 Automatic
Arm7Y Arm2 18.200 Shear 18.200 Shear 129 8.25 21.113 18.200 28.125 30.238 40.441 0.000 0.000 0.000
0.000 0.000 Automatic
Arm8P Arm2 18.200 Shear 18.200 Shear 98 4.00 25.851 18.200 28.125 30.238 40.441 0.000 0.000 0.000
0.000 0.000 Automatic
Arm8Y Arm2 18.200 Shear 18.200 Shear 98 4.00 25.851 18.200 28.125 30.238 40.441 0.000 0.000 0.000
0.000 0.000 Automatic
Diagonal 1P Diag1 19.584 L/r 27.300 Shear 145 13.15 19.584 27.300 42.187 34.856 32.812 0.000 0.000 0.000
0.000 0.000 Automatic Member "Diagonal 1P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Diagonal 1X Diag1 19.584 L/r 27.300 Shear 145 13.15 19.584 27.300 42.187 34.856 32.812 0.000 0.000 0.000
0.000 0.000 Automatic Member "Diagonal 1X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Diagonal 1XY Diag1 19.584 L/r 27.300 Shear 145 13.15 19.584 27.300 42.187 34.856 32.812 0.000 0.000 0.000
0.000 0.000 Automatic Member "Diagonal 1XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Diagonal 1Y Diag1 19.584 L/r 27.300 Shear 145 13.15 19.584 27.300 42.187 34.856 32.812 0.000 0.000 0.000
0.000 0.000 Automatic Member "Diagonal 1Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Diagonal 2P Diag2 7.665 L/r 7.309 Net Sect 113 9.43 7.665 9.100 10.547 7.309 8.490 0.000 0.000 0.000
0.000 0.000 Automatic
Diagonal 2X Diag2 7.665 L/r 7.309 Net Sect 113 9.43 7.665 9.100 10.547 7.309 8.490 0.000 0.000 0.000
0.000 0.000 Automatic
Diagonal 3P Diag2 7.780 L/r 7.309 Net Sect 111 9.28 7.780 9.100 10.547 7.309 8.490 0.000 0.000 0.000
0.000 0.000 Automatic
Diagonal 3X Diag2 7.780 L/r 7.309 Net Sect 111 9.28 7.780 9.100 10.547 7.309 8.490 0.000 0.000 0.000
0.000 0.000 Automatic
Diagonal 3XY Diag2 7.780 L/r 7.309 Net Sect 111 9.28 7.780 9.100 10.547 7.309 8.490 0.000 0.000 0.000
0.000 0.000 Automatic
Diagonal 3Y Diag2 7.780 L/r 7.309 Net Sect 111 9.28 7.780 9.100 10.547 7.309 8.490 0.000 0.000 0.000
0.000 0.000 Automatic
Diagonal 4P Diag3 9.100 Shear 9.100 Shear 48 4.00 14.428 9.100 14.062 9.745 11.320 0.000 0.000 0.000
0.000 0.000 Automatic
Diagonal 4Y Diag3 9.100 Shear 9.100 Shear 48 4.00 14.428 9.100 14.062 9.745 11.320 0.000 0.000 0.000
0.000 0.000 Automatic
Diagonal 5P Diag2 6.616 L/r 7.309 Net Sect 127 10.59 6.616 9.100 10.547 7.309 8.490 0.000 0.000 0.000
0.000 0.000 Automatic
Diagonal 5X Diag2 6.616 L/r 7.309 Net Sect 127 10.59 6.616 9.100 10.547 7.309 8.490 0.000 0.000 0.000
0.000 0.000 Automatic
Diagonal 5XY Diag2 6.616 L/r 7.309 Net Sect 127 10.59 6.616 9.100 10.547 7.309 8.490 0.000 0.000 0.000
0.000 0.000 Automatic
Diagonal 5Y Diag2 6.616 L/r 7.309 Net Sect 127 10.59 6.616 9.100 10.547 7.309 8.490 0.000 0.000 0.000
0.000 0.000 Automatic
Diagonal 6P Diag3 9.100 Shear 9.100 Shear 48 4.00 14.428 9.100 14.062 9.745 11.320 0.000 0.000 0.000
0.000 0.000 Automatic
Diagonal 6Y Diag3 9.100 Shear 9.100 Shear 48 4.00 14.428 9.100 14.062 9.745 11.320 0.000 0.000 0.000
0.000 0.000 Automatic
g60P Inner1 9.100 Shear 6.100 Rupture 99 5.66 13.392 9.100 10.547 14.585 6.100 0.000 0.000 0.000
0.000 0.000 Automatic
g60X Inner1 9.100 Shear 6.100 Rupture 99 5.66 13.392 9.100 10.547 14.585 6.100 0.000 0.000 0.000
0.000 0.000 Automatic
g61P Inner1 9.100 Shear 6.100 Rupture 99 5.66 13.392 9.100 10.547 14.585 6.100 0.000 0.000 0.000
0.000 0.000 Automatic
g61X Inner1 9.100 Shear 6.100 Rupture 99 5.66 13.392 9.100 10.547 14.585 6.100 0.000 0.000 0.000
0.000 0.000 Automatic
g62P Inner1 9.100 Shear 6.100 Rupture 99 5.66 13.392 9.100 10.547 14.585 6.100 0.000 0.000 0.000
0.000 0.000 Automatic

g62X	Inner1	9.100	Shear	6.100	Rupture	99	5.66	13.392	9.100	10.547	14.585	6.100	0.000	0.000	0.000	0.000	0.000	Automatic
g63P	Inner1	9.100	Shear	6.100	Rupture	99	5.66	13.392	9.100	10.547	14.585	6.100	0.000	0.000	0.000	0.000	0.000	Automatic
g63X	Inner1	9.100	Shear	6.100	Rupture	99	5.66	13.392	9.100	10.547	14.585	6.100	0.000	0.000	0.000	0.000	0.000	Automatic
g64P	Inner2	1.023	L/r	7.646	Rupture	417	20.36	1.023	9.100	10.547	14.585	7.646	0.000	0.000	0.000	0.000	0.000	Automatic
g64X	Inner2	1.023	L/r	7.646	Rupture	417	20.36	1.023	9.100	10.547	14.585	7.646	0.000	0.000	0.000	0.000	0.000	Automatic
Diagonal 7P	Diag2	9.100	Shear	7.309	Net Sect	30	2.47	11.400	9.100	10.547	7.309	8.490	0.000	0.000	0.000	0.000	0.000	Automatic
Diagonal 7X	Diag2	9.100	Shear	7.309	Net Sect	30	2.47	11.400	9.100	10.547	7.309	8.490	0.000	0.000	0.000	0.000	0.000	Automatic
Diagonal 7XY	Diag2	9.100	Shear	7.309	Net Sect	30	2.47	11.400	9.100	10.547	7.309	8.490	0.000	0.000	0.000	0.000	0.000	Automatic
Diagonal 7Y	Diag2	9.100	Shear	7.309	Net Sect	30	2.47	11.400	9.100	10.547	7.309	8.490	0.000	0.000	0.000	0.000	0.000	Automatic
Diagonal 8P	Diag2	9.100	Shear	7.309	Net Sect	30	2.47	11.400	9.100	10.547	7.309	8.490	0.000	0.000	0.000	0.000	0.000	Automatic
Diagonal 8X	Diag2	9.100	Shear	7.309	Net Sect	30	2.47	11.400	9.100	10.547	7.309	8.490	0.000	0.000	0.000	0.000	0.000	Automatic
Diagonal 8XY	Diag2	9.100	Shear	7.309	Net Sect	30	2.47	11.400	9.100	10.547	7.309	8.490	0.000	0.000	0.000	0.000	0.000	Automatic
Diagonal 8Y	Diag2	9.100	Shear	7.309	Net Sect	30	2.47	11.400	9.100	10.547	7.309	8.490	0.000	0.000	0.000	0.000	0.000	Automatic

The model contains 223 angle members.

Sum of Unfactored Dead Load and Drag Areas From Equipment, Input and Calculated:

Joint Label	Dead Load (kips)	X-Drag Area (ft^2)	Y-Drag Area (ft^2)
1P	0.0791	4.428	2.324
2P	0.108	5.651	3.798
7P	0.127	5.270	4.561
8P	0.123	4.552	4.552
9P	0.163	7.214	7.214
15P	0.0974	5.042	1.571
16P	0.0398	2.453	0.833
17P	0.0732	5.233	1.026
18P	0.0457	3.176	1.200
19P	0.00994	1.279	0.513
1X	0.0791	4.428	2.324
2X	0.108	5.651	3.798
2XY	0.108	5.651	3.798
2Y	0.108	5.651	3.798
7X	0.127	5.270	4.561
7XY	0.127	5.270	4.561
7Y	0.127	5.270	4.561
8X	0.123	4.552	4.552
8XY	0.123	4.552	4.552
8Y	0.123	4.552	4.552
9X	0.163	7.214	7.214
9XY	0.163	7.214	7.214
9Y	0.163	7.214	7.214
15X	0.0974	5.042	1.571

16X	0.0398	2.453	0.833
17X	0.0732	5.233	1.026
18X	0.0457	3.176	1.200
19X	0.00994	1.279	0.513
19XY	0.00994	1.279	0.513
19Y	0.00994	1.279	0.513
3S	0.0608	2.544	2.544
4S	0.0754	3.175	2.782
5S	0.129	6.118	4.350
6S	0.092	5.026	4.330
10S	0.128	4.607	4.607
11S	0.133	5.013	5.013
12S	0.14	5.586	5.586
13S	0.195	7.377	7.377
14S	0.37	14.579	14.579
3X	0.0608	2.544	2.544
3XY	0.0608	2.544	2.544
3Y	0.0608	2.544	2.544
4X	0.0754	3.175	2.782
4XY	0.0754	3.175	2.782
4Y	0.0754	3.175	2.782
5X	0.129	6.118	4.350
5XY	0.129	6.118	4.350
5Y	0.129	6.118	4.350
6X	0.092	5.026	4.330
6XY	0.092	5.026	4.330
6Y	0.092	5.026	4.330
10X	0.128	4.607	4.607
10XY	0.128	4.607	4.607
10Y	0.128	4.607	4.607
11X	0.133	5.013	5.013
11XY	0.133	5.013	5.013
11Y	0.133	5.013	5.013
12X	0.14	5.586	5.586
12XY	0.14	5.586	5.586
12Y	0.14	5.586	5.586
13X	0.195	7.377	7.377
13XY	0.195	7.377	7.377
13Y	0.195	7.377	7.377
14X	0.37	14.579	14.579
14XY	0.37	14.579	14.579
14Y	0.37	14.579	14.579
Total	8.09	352.629	301.126

Unadjusted Dead Load and Drag Areas by Section:

Section Label	Unfactored Dead Load (kips)	X-Drag Area All (ft^2)	Y-Drag Area All (ft^2)	X-Drag Area Face (ft^2)	Y-Drag Area Face (ft^2)
1	3.333	166.458	114.955	76.010	37.621
2	4.753	186.171	186.171	72.049	72.049
Total	8.086	352.629	301.126	148.059	109.670

Angle Member Weights and Surface Areas by Section:

Section Label	Unfactored Weight (kips)	Factored Weight (kips)	Unfactored Surface Area (ft^2)	Factored Surface Area (ft^2)

1	3.333	3.499	650.389	682.909
2	4.753	4.991	857.800	900.690
Total	8.086	8.490	1508.189	1583.599

Section Joint Information:

Section Label	Joint Label	Joint Elevation (ft)
1	1P	78.250
1	2P	73.250
1	1X	78.250
1	2X	73.250
1	2XY	73.250
1	2Y	73.250
1	3S	69.750
1	3X	69.750
1	3XY	69.750
1	3Y	69.750
1	4S	66.250
1	4X	66.250
1	4XY	66.250
1	4Y	66.250
1	5S	62.750
1	5X	62.750
1	5XY	62.750
1	5Y	62.750
1	6S	58.500
1	6X	58.500
1	6XY	58.500
1	6Y	58.500
1	7P	54.250
1	7X	54.250
1	7XY	54.250
1	7Y	54.250
1	8P	50.000
1	8X	50.000
1	8XY	50.000
1	8Y	50.000
1	15P	78.250
1	15X	78.250
1	16P	73.250
1	16X	73.250
1	17P	62.750
1	17X	62.750
1	18P	54.250
1	18X	54.250
1	19X	64.500
1	19P	64.500
1	19Y	64.500
1	19XY	64.500
2	8P	50.000
2	10S	44.000
2	8X	50.000
2	10X	44.000
2	8XY	50.000
2	10XY	44.000

2	8Y	50.000
2	10Y	44.000
2	11S	37.500
2	11X	37.500
2	11XY	37.500
2	11Y	37.500
2	12S	31.000
2	12X	31.000
2	12XY	31.000
2	12Y	31.000
2	13S	24.830
2	13X	24.830
2	13XY	24.830
2	13Y	24.830
2	14S	17.500
2	14X	17.500
2	14XY	17.500
2	14Y	17.500
2	9P	0.000
2	9X	0.000
2	9XY	0.000
2	9Y	0.000

Sections Information:

Section Label	Top Z (ft)	Bottom Z (ft)	Joint Count	Member Count	Tran. Face Top Width (ft)	Tran. Face Bot Width (ft)	Tran. Face Gross Area (ft^2)	Long. Face Top Width (ft)	Long. Face Bot Width (ft)	Long. Face Gross Area (ft^2)
1	78.250	50.000	42	145	0.00	4.00	103.000	28.00	4.00	274.125
2	50.000	0.000	28	78	4.00	20.00	600.000	4.00	20.00	600.000

*** Insulator Data

Clamp Properties:

Label	Stock Number	Holding Capacity (lbs)
C-EX1		5e+004

Clamp Insulator Connectivity:

Clamp Label	Structure And Tip Attach	Property Set	Min. Required Vertical Load (uplift) (lbs)
Clamp1	15P	C-EX1	No Limit
Clamp2	15X	C-EX1	No Limit
Clamp3	16P	C-EX1	No Limit
Clamp4	16X	C-EX1	No Limit
Clamp5	17P	C-EX1	No Limit
Clamp6	17X	C-EX1	No Limit
Clamp7	18P	C-EX1	No Limit
Clamp8	18X	C-EX1	No Limit
Clamp9	2P	C-EX1	No Limit
Clamp10	4S	C-EX1	No Limit

Clamp11	6S	C-EX1	No Limit
Clamp12	8P	C-EX1	No Limit
Clamp13	10S	C-EX1	No Limit
Clamp14	12S	C-EX1	No Limit
Clamp15	14S	C-EX1	No Limit
Clamp16	2X	C-EX1	No Limit
Clamp17	4X	C-EX1	No Limit
Clamp18	6X	C-EX1	No Limit
Clamp19	8X	C-EX1	No Limit
Clamp20	10X	C-EX1	No Limit
Clamp21	12X	C-EX1	No Limit
Clamp22	14X	C-EX1	No Limit
Clamp23	5S	C-EX1	No Limit
Clamp24	5X	C-EX1	No Limit
Clamp25	2Y	C-EX1	No Limit
Clamp26	2XY	C-EX1	No Limit
Clamp27	5Y	C-EX1	No Limit
Clamp28	5XY	C-EX1	No Limit
Clamp29	4Y	C-EX1	No Limit
Clamp30	6Y	C-EX1	No Limit
Clamp31	8Y	C-EX1	No Limit
Clamp32	10Y	C-EX1	No Limit
Clamp33	12Y	C-EX1	No Limit
Clamp34	14Y	C-EX1	No Limit
Clamp35	4XY	C-EX1	No Limit
Clamp36	6XY	C-EX1	No Limit
Clamp37	8XY	C-EX1	No Limit
Clamp38	10XY	C-EX1	No Limit
Clamp39	12XY	C-EX1	No Limit
Clamp40	14XY	C-EX1	No Limit
Clamp43	3XY	C-EX1	No Limit
Clamp44	3Y	C-EX1	No Limit

*** Loads Data

Loads from file: j:\jobs\1330500.wi\04_structural\backup documentation\calcs\rev (4)\pls tower\meriden.lca

Insulator dead and wind loads are already included in the point loads printed below.

Loading Method Parameters:

Structure Height Summary (used for calculating wind/ice adjust with height):

Z of ground for wind height adjust	0.00 (ft)	and structure Z coordinate that will be put on the centerline ground profile in PLS-CADD.
Ground elevation shift	0.00 (ft)	
Z of ground with shift	0.00 (ft)	
Z of structure top (highest joint)	78.25 (ft)	
Structure height	78.25 (ft)	
Structure height above ground	78.25 (ft)	
Tower Shape	Rectangular	

Load distributed evenly among joints in section for section based load cases

Vector Load Cases:

Load Case Description	Dead Load Factor	Wind Area Factor	SF for Steel Poles Tubular Arms and Towers	SF for Guys and Cables	SF for Insuls.	SF For Found.	Point Loads	Wind/Ice Model	Trans. Wind Pressure (psf)	Longit. Wind Pressure (psf)	Ice Thick. (in)	Ice Density (lbs/ft^3)	Temperature (deg F)	Joint Displ.
NESC Heavy	1.5000	2.5000	1.00000	1.0000	1.0000	1.0000	30 loads	Wind on Face	4	0	0.000	56.000	60.0	
NESC Extreme	1.0000	1.0000	1.00000	1.0000	1.0000	1.0000	30 loads	NESC 2012	31	0	0.000	56.000	60.0	

Point Loads for Load Case "NESC Heavy":

Joint Label	Vertical Load (lbs)	Transverse Load (lbs)	Longitudinal Load (lbs)	Load Comment
15X	1134	799	0	Shield Wire
16X	1871	906	0	Conductor
17X	1871	906	0	Conductor
18X	1871	906	0	Conductor
15P	1133	800	0	Shield Wire
16P	1870	906	0	Conductor
17P	1870	906	0	Conductor
18P	1870	906	0	Conductor
2P	569	207	0	Coax Cables
4S	509	185	0	Coax Cables
6S	560	204	0	Coax Cables
8P	500	182	0	Coax Cables
10S	655	238	0	Coax Cables
12S	914	332	0	Coax Cables
14S	1673	609	0	Coax Cables
2X	569	207	0	Coax Cables
4X	509	185	0	Coax Cables
6X	560	204	0	Coax Cables
8X	500	182	0	Coax Cables
10X	655	238	0	Coax Cables

12X	914	332	0	Coax Cables
14X	1673	609	0	Coax Cables
2X	4236	1279	1085	
2XY	3831	1139	-1112	
2P	825	1288	-1062	
2Y	429	1150	1089	
5X	4298	-374	-333	
5XY	3921	-362	335	
5S	200	-308	308	
5Y	-104	-301	-310	

Section Load Case Information (Standard) for "NESC Heavy":

Section Label	Z of Top (ft)	Z of Bottom (ft)	Ave. Elev. Above Ground (ft)	Res. Adj. Wind Pres. (psf)	Tran Adj. Wind Pres. (psf)	Tran Drag Coef	Tran Wind Load (lbs)	Long Adj. Wind Pres. (psf)	Long Drag Coef	Long Wind Load (lbs)	Ice Weight (lbs)	Total Weight (lbs)
1	78.25	50.00	64.13	10.00	10.00	3.300	1241.5	0.00	3.300	0.0	0	5249
2	50.00	0.00	25.00	10.00	10.00	3.300	2377.6	0.00	3.300	0.0	0	7486

Point Loads for Load Case "NESC Extreme":

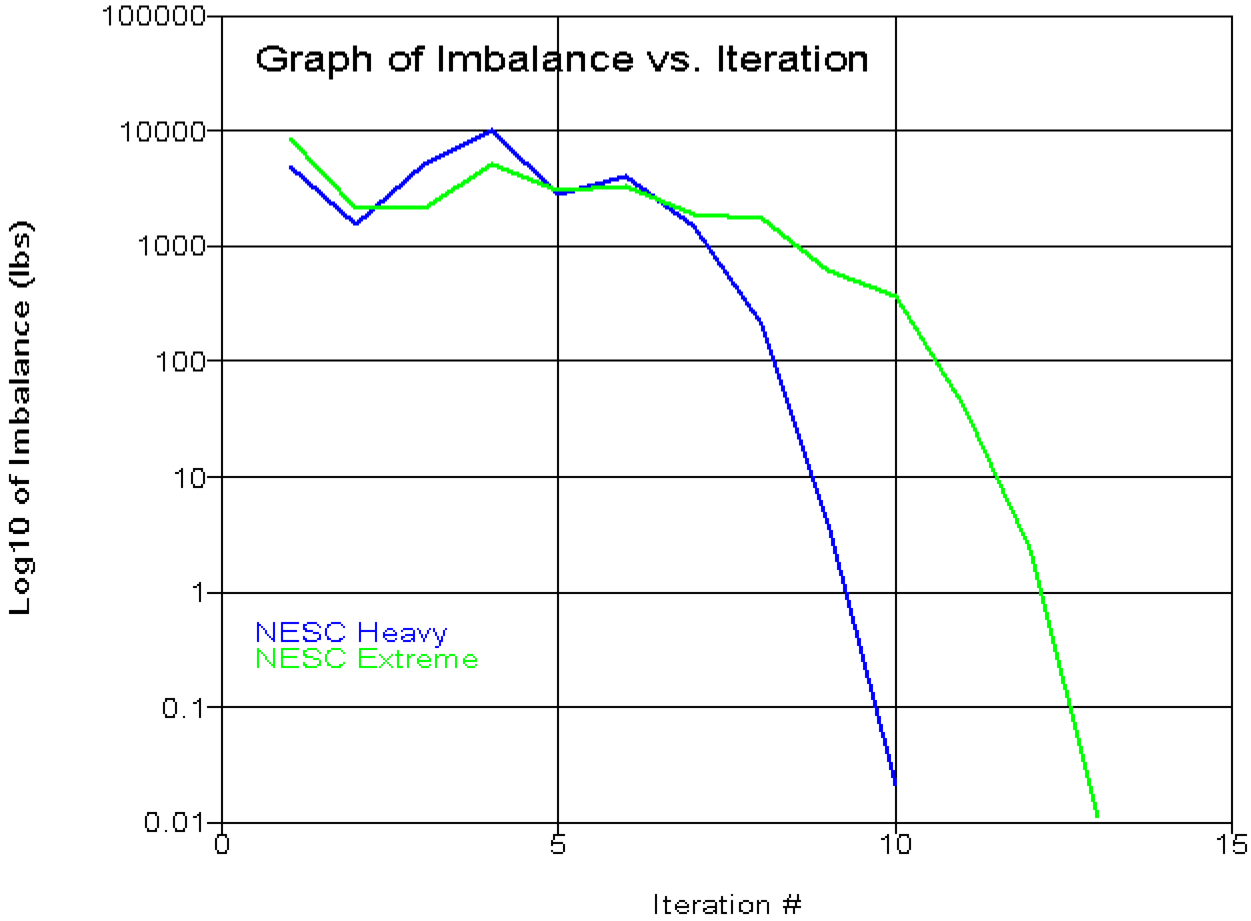
Joint Label	Vertical Load (lbs)	Transverse Load (lbs)	Longitudinal Load (lbs)	Load Comment
15X	249	574	0	Shield Wire
16X	632	873	0	Conductor
17X	632	873	0	Conductor
18X	632	873	0	Conductor
15P	249	569	6	Shield Wire
16P	632	867	35	Conductor
17P	632	867	35	Conductor
18P	632	867	35	Conductor
2P	154	663	0	Coax Cables
4S	138	592	0	Coax Cables
6S	152	653	0	Coax Cables
8P	136	582	0	Coax Cables
10S	178	763	0	Coax Cables
12S	248	1064	0	Coax Cables
14S	454	1947	0	Coax Cables
2X	154	663	0	Coax Cables
4X	138	592	0	Coax Cables
6X	152	653	0	Coax Cables
8X	136	582	0	Coax Cables
10X	178	763	0	Coax Cables
12X	248	1064	0	Coax Cables
14X	454	1947	0	Coax Cables
2X	7256	4333	3732	
2XY	7139	3961	-3805	
2P	-4929	4425	-3729	
2Y	-5025	4053	3802	
5X	8359	-1292	-1159	
5XY	817	-1266	1165	
5S	-6196	-1186	1150	
5Y	-6191	-1161	-1155	

Section Load Case Information (Code) for "NESC Extreme":

Section Label	Z of Top (ft)	Z of Bottom (ft)	Ave. Elev. Above Ground (ft)	Res. Adj. Wind Pres. (psf)	Tran Adj. Wind Pres. (psf)	Tran Angle Face Area (ft^2)	Tran Gross Area (ft^2)	Tran Soli-dity Ratio	Tran Angle Drag Coef	Tran Wind Load (lbs)	Long Adj. Wind Pres. (psf)	Long Angle Face Area (ft^2)	Long Gross Area (ft^2)	Long Soli-dity Ratio	Long Angle Drag Coef	Long Wind Load (lbs)	Ice Weight (lbs)	Total Weight (lbs)
1	78.25	50.00	64.13	30.48	30.48	41.38	103.00	0.402	3.200	4035.7	0.00	83.61	274.13	0.305	3.200	0.0	0	3499
2	50.00	0.00	25.00	30.48	30.48	79.25	600.00	0.132	3.200	7728.9	0.00	79.25	600.00	0.132	3.200	0.0	0	4991

*** Analysis Results:

Maximum element usage is 96.54% for Angle "Leg13X" in load case "NESC Extreme"
Maximum insulator usage is 19.60% for Clamp "Clamp16" in load case "NESC Extreme"



Angle Forces For All Load Cases:
Positive for tension - negative for compression

Group Label	Angle Label	Max. Usage For All LC %	Max. Tens. For All LC (kips)	Max. Comp. For All LC (kips)	LC 1 (kips)	LC 2 (kips)
Leg1	Leg1P	3.59	0.134	-0.364	-0.364	0.134
Leg1	Leg1X	14.57	0.000	-1.474	-1.474	-0.822
Leg1	Leg1XY	14.86	0.000	-1.504	-1.504	-0.938
Leg1	Leg1Y	3.29	0.239	-0.333	-0.333	0.239

Leg2	Leg2P	15.71	9.657	0.000	0.133	9.657
Leg2	Leg2X	18.01	0.000	-13.103	-9.051	-13.103
Leg2	Leg2XY	18.37	0.000	-13.370	-8.163	-13.370
Leg2	Leg2Y	17.08	10.501	0.000	1.166	10.501
Leg2	Leg3P	31.13	19.135	0.000	3.331	19.135
Leg2	Leg3X	32.23	0.000	-23.451	-14.228	-23.451
Leg2	Leg3XY	33.44	0.000	-24.335	-13.346	-24.335
Leg2	Leg3Y	33.77	20.758	0.000	4.440	20.758
Leg2	Leg4P	44.13	27.129	0.000	4.319	27.129
Leg2	Leg4X	45.47	0.000	-33.087	-20.439	-33.087
Leg2	Leg4XY	46.88	0.000	-34.115	-19.091	-34.115
Leg2	Leg4Y	47.58	29.250	0.000	5.744	29.250
Leg2	Leg5P	74.01	45.498	0.000	11.452	45.498
Leg2	Leg5X	75.54	0.000	-52.660	-28.025	-52.660
Leg2	Leg5XY	67.12	0.000	-46.792	-26.207	-46.792
Leg2	Leg5Y	77.47	47.626	0.000	13.036	47.626
Leg2	Leg6P	91.03	56.024	0.000	15.366	56.024
Leg2	Leg6X	92.23	0.000	-64.295	-34.799	-64.295
Leg2	Leg6XY	84.44	0.000	-58.861	-32.439	-58.861
Leg2	Leg6Y	96.10	59.146	0.000	17.429	59.146
Leg3	Leg7P	74.21	61.911	0.000	19.462	61.911
Leg3	Leg7X	72.84	0.000	-69.878	-37.256	-69.878
Leg3	Leg7XY	66.96	0.000	-64.238	-34.729	-64.238
Leg3	Leg7Y	77.87	64.965	0.000	21.368	64.965
Leg3	Leg8P	81.18	67.723	0.000	21.318	67.723
Leg3	Leg8X	94.14	0.000	-76.620	-42.463	-76.620
Leg3	Leg8XY	89.02	0.000	-72.455	-40.187	-72.455
Leg3	Leg8Y	85.99	71.734	0.000	23.662	71.734
Leg3	Leg9P	76.44	63.770	0.000	18.224	63.770
Leg3	Leg9X	96.12	0.000	-73.586	-43.506	-73.586
Leg3	Leg9XY	93.54	0.000	-71.609	-41.531	-71.609
Leg3	Leg9Y	82.47	68.800	0.000	21.125	68.800
Leg3	Leg10P	68.72	57.330	0.000	15.989	57.330
Leg3	Leg10X	86.14	0.000	-65.942	-39.691	-65.942
Leg3	Leg10XY	85.11	0.000	-65.156	-38.398	-65.156
Leg3	Leg10Y	73.97	61.705	0.000	18.293	61.705
Leg3	Leg11P	77.83	56.659	0.000	14.562	56.659
Leg3	Leg11X	91.28	0.000	-66.454	-40.930	-66.454
Leg3	Leg11XY	89.73	0.000	-65.324	-38.970	-65.324
Leg3	Leg11Y	83.23	60.589	0.000	17.236	60.589
Leg4	Leg12P	65.09	55.666	0.000	13.878	55.666
Leg4	Leg12X	71.59	0.000	-64.890	-40.074	-64.890
Leg4	Leg12XY	69.85	0.000	-63.307	-38.134	-63.307
Leg4	Leg12Y	68.12	58.257	0.000	15.937	58.257
Leg4	Leg13P	71.39	51.972	0.000	10.969	51.972
Leg4	Leg13X	96.54	0.000	-70.281	-43.682	-70.281
Leg4	Leg13XY	89.14	0.000	-64.896	-39.807	-64.896
Leg4	Leg13Y	74.08	53.932	0.000	13.848	53.932
XBrace1	XBrace1P	10.08	0.000	-0.917	-0.917	-0.685
XBrace1	XBrace1X	8.11	0.495	0.000	0.462	0.495
XBrace1	XBrace1XY	10.48	0.639	0.000	0.498	0.639
XBrace1	XBrace1Y	10.49	0.000	-0.954	-0.954	-0.815
XBrace1	XBrace2P	52.82	0.000	-7.708	-3.869	-7.708
XBrace1	XBrace2X	55.44	7.124	0.000	2.219	7.124
XBrace1	XBrace2XY	51.47	6.613	0.000	2.013	6.613
XBrace1	XBrace2Y	49.20	0.000	-7.180	-3.619	-7.180
XBrace1	XBrace3P	5.29	0.000	-0.772	-0.155	-0.772
XBrace1	XBrace3X	6.65	0.854	0.000	0.376	0.854
XBrace1	XBrace3XY	1.75	0.107	-0.255	0.107	-0.255

XBrace1	XBrace3Y	1.79	0.230	0.000	0.101	0.230
XBrace1R	XBrace4P	41.72	0.000	-7.594	-2.461	-7.594
XBrace1R	XBrace4X	44.01	8.011	0.000	3.908	8.011
XBrace1R	XBrace4XY	40.98	7.458	0.000	3.653	7.458
XBrace1R	XBrace4Y	38.71	0.000	-7.046	-2.238	-7.046
XBrace1R	XBrace5P	0.53	0.096	0.000	0.040	0.096
XBrace1R	XBrace5X	1.18	0.000	-0.214	-0.214	-0.060
XBrace1R	XBrace5XY	6.56	0.000	-1.193	-0.491	-1.193
XBrace1R	XBrace5Y	6.11	1.113	0.000	0.298	1.113
XBrace1R	XBrace6P	47.17	0.000	-8.584	-3.656	-8.584
XBrace1R	XBrace6X	46.21	8.410	0.000	3.049	8.410
XBrace1R	XBrace6XY	39.71	7.228	0.000	2.767	7.228
XBrace1R	XBrace6Y	40.42	0.000	-7.357	-3.052	-7.357
XBrace1R	XBrace7P	10.44	0.000	-1.901	-1.237	-1.901
XBrace1R	XBrace7X	8.36	1.521	-0.015	-0.015	1.521
XBrace1R	XBrace7XY	2.22	0.404	-0.288	-0.288	0.404
XBrace1R	XBrace7Y	5.43	0.000	-0.987	-0.987	-0.897
XBrace2	XBrace8P	32.70	0.000	-8.928	-4.956	-8.928
XBrace2	XBrace8X	44.57	7.926	0.000	2.930	7.926
XBrace2	XBrace8XY	41.90	7.452	0.000	2.763	7.452
XBrace2	XBrace8Y	26.59	0.000	-7.258	-4.353	-7.258
XBrace2	XBrace9P	2.81	0.000	-0.768	-0.251	-0.768
XBrace2	XBrace9X	4.74	0.843	-0.037	-0.037	0.843
XBrace2	XBrace9XY	3.55	0.000	-0.969	-0.465	-0.969
XBrace2	XBrace9Y	5.02	0.892	0.000	0.155	0.892
XBrace2	XBrace10P	36.05	0.000	-9.842	-5.296	-9.842
XBrace2	XBrace10X	41.07	8.834	0.000	3.269	8.834
XBrace2	XBrace10XY	36.43	7.836	0.000	3.034	7.836
XBrace2	XBrace10Y	28.40	0.000	-7.754	-4.465	-7.754
XBrace2	XBrace11P	6.80	0.000	-1.538	-1.010	-1.538
XBrace2	XBrace11X	6.67	1.435	0.000	0.060	1.435
XBrace2	XBrace11XY	1.55	0.000	-0.350	-0.350	-0.301
XBrace2	XBrace11Y	2.89	0.000	-0.655	-0.655	-0.038
XBrace3	XBrace12P	60.27	0.000	-10.969	-6.677	-10.969
XBrace3	XBrace12X	51.69	9.407	0.000	3.174	9.407
XBrace3	XBrace12XY	43.98	8.005	0.000	2.919	8.005
XBrace3	XBrace12Y	45.35	0.000	-8.253	-5.775	-8.253
XBrace3	XBrace13P	65.18	0.000	-11.862	-6.081	-11.862
XBrace3	XBrace13X	62.58	11.390	0.000	3.739	11.390
XBrace3	XBrace13XY	52.19	9.499	0.000	3.223	9.499
XBrace3	XBrace13Y	55.71	0.000	-10.139	-5.575	-10.139
XBrace4	XBrace14P	49.04	0.000	-7.200	-3.529	-7.200
XBrace4	XBrace14X	34.12	6.209	0.000	1.811	6.209
XBrace4	XBrace14XY	42.93	7.813	0.000	2.479	7.813
XBrace4	XBrace14Y	54.78	0.000	-8.045	-3.586	-8.045
XBrace4	XBrace15P	52.29	0.000	-7.052	-3.586	-7.052
XBrace4	XBrace15X	31.68	5.765	0.000	1.609	5.765
XBrace4	XBrace15XY	20.23	3.682	0.000	1.345	3.682
XBrace4	XBrace15Y	22.38	0.000	-3.018	-2.097	-3.018
XBrace4	XBrace16P	22.40	4.078	0.000	2.019	4.078
XBrace4	XBrace16X	30.56	0.000	-3.121	-0.894	-3.121
XBrace4	XBrace16XY	18.26	0.000	-1.866	-0.856	-1.866
XBrace4	XBrace16Y	8.53	1.552	0.000	0.975	1.552
XBrace4	XBrace17P	17.45	3.177	0.000	1.616	3.177
XBrace4	XBrace17X	27.17	0.000	-2.924	-1.109	-2.924
XBrace4	XBrace17XY	44.31	0.000	-4.770	-1.677	-4.770
XBrace4	XBrace17Y	25.38	4.618	0.000	2.048	4.618
XBrace5	XBrace18P	19.64	1.502	0.000	0.535	1.502
XBrace5	XBrace18X	34.75	0.000	-1.948	-1.151	-1.948

XBrace5	XBrace18XY	52.54	0.000	-2.945	-1.440	-2.945
XBrace5	XBrace18Y	36.41	2.784	0.000	0.947	2.784
XBrace5	XBrace19P	62.79	0.000	-2.697	-1.353	-2.697
XBrace5	XBrace19X	24.07	1.840	0.000	0.488	1.840
XBrace5	XBrace19XY	12.75	0.975	0.000	0.463	0.975
XBrace5	XBrace19Y	22.45	0.000	-0.964	-0.630	-0.964
XBrace6	XBrace20P	2.78	0.228	0.000	0.228	0.056
XBrace6	XBrace20X	2.77	0.141	-0.252	-0.252	0.141
XBrace6	XBrace20XY	20.85	0.000	-1.897	-0.764	-1.897
XBrace6	XBrace20Y	23.09	1.894	0.000	0.907	1.894
XBrace6	XBrace21P	7.74	0.635	0.000	0.291	0.635
XBrace6	XBrace21X	10.19	0.000	-0.685	-0.490	-0.685
XBrace6	XBrace21XY	19.40	0.000	-1.303	-0.359	-1.303
XBrace6	XBrace21Y	23.73	1.946	0.000	0.965	1.946
XBrace7	XBrace22P	6.80	0.000	-0.619	-0.124	-0.619
XBrace7	XBrace22X	2.82	0.204	-0.257	-0.257	0.204
XBrace7	XBrace22XY	15.40	0.000	-1.401	-0.853	-1.401
XBrace7	XBrace22Y	13.45	1.224	0.000	0.381	1.224
XBrace7	XBrace23P	19.27	0.000	-1.754	-0.938	-1.754
XBrace7	XBrace23X	11.22	1.021	0.000	0.224	1.021
XBrace7	XBrace23XY	5.47	0.498	0.000	0.338	0.498
XBrace7	XBrace23Y	5.54	0.000	-0.504	-0.274	-0.504
XBrace8	XBrace24P	39.51	5.763	0.000	1.522	5.763
XBrace8	XBrace24X	0.00	0.000	0.000	0.000	0.000
XBrace8	XBrace24XY	10.18	1.484	0.000	0.507	1.484
XBrace8	XBrace24Y	0.00	0.000	0.000	0.000	0.000
XBrace8	XBrace25P	10.75	1.567	0.000	1.100	1.567
XBrace8	XBrace25X	27.02	3.941	0.000	1.114	3.941
XBrace8	XBrace25XY	32.19	4.696	0.000	0.891	4.696
XBrace8	XBrace25Y	0.00	0.000	0.000	0.000	0.000
Horz1	Horz1P	59.13	4.521	0.000	2.524	4.521
Horz1	Horz1X	41.92	0.000	-3.814	-0.400	-3.814
Horz1	Horz2P	15.45	1.181	0.000	1.181	0.406
Horz1	Horz2X	13.09	1.001	0.000	1.001	0.189
Horz3	Horz3P	89.45	8.140	0.000	4.672	8.140
Horz3	Horz3X	81.28	0.000	-7.397	-1.993	-7.397
Horz1	Horz4P	17.84	0.000	-1.623	-0.905	-1.623
Horz1	Horz4X	16.82	1.391	0.000	0.461	1.391
Horz1	Horz5P	1.40	0.000	-0.128	-0.060	-0.128
Horz1	Horz5Y	0.75	0.000	-0.068	-0.039	-0.068
Horz2	Horz6P	26.24	0.000	-2.388	-0.818	-2.388
Horz2	Horz6Y	8.33	0.000	-0.758	-0.130	-0.758
Horz2	Horz7P	0.90	0.082	-0.001	-0.001	0.082
Horz2	Horz7X	47.17	0.000	-4.292	-1.087	-4.292
Arm1	Arm1P	24.22	2.204	0.000	2.204	0.092
Arm1	Arm1X	42.58	3.874	0.000	3.874	1.456
Arm1	Arm2P	70.01	6.371	0.000	6.371	2.000
Arm2	Arm3P	22.74	0.000	-2.070	-2.070	-1.149
Arm2	Arm3X	12.21	0.000	-1.111	-1.111	-0.080
Arm2	Arm3XY	12.13	0.000	-1.104	-1.104	-0.067
Arm2	Arm3Y	22.68	0.000	-2.064	-2.064	-0.999
Arm2	Arm4P	24.65	0.000	-2.244	-2.244	-0.664
Arm2	Arm4Y	24.71	0.000	-2.248	-2.248	-0.556
Arm3	Arm5P	30.89	0.000	-5.623	-5.623	-2.183
Arm3	Arm5X	24.84	0.000	-4.522	-4.522	-0.821
Arm3	Arm5XY	25.16	0.000	-4.579	-4.579	-0.946
Arm3	Arm5Y	30.76	0.000	-5.597	-5.597	-1.864
Arm3	Arm6P	11.49	0.000	-2.092	-2.092	-0.544
Arm3	Arm6Y	13.01	0.000	-2.367	-2.367	-0.919

Arm2	Arm7P	13.22	0.000	-2.406	-2.406	-1.392
Arm2	Arm7X	7.29	0.046	-1.328	-1.328	0.046
Arm2	Arm7XY	8.05	0.000	-1.465	-1.465	-0.374
Arm2	Arm7Y	12.83	0.000	-2.334	-2.334	-1.000
Arm2	Arm8P	0.81	0.148	-0.131	-0.131	0.148
Arm2	Arm8Y	3.75	0.000	-0.683	-0.587	-0.683
Diag1	Diagonal 1P	8.60	0.000	-1.684	-1.684	-0.443
Diag1	Diagonal 1X	8.61	0.000	-1.685	-1.685	-0.433
Diag1	Diagonal 1XY	8.56	0.000	-1.677	-1.677	-0.421
Diag1	Diagonal 1Y	8.56	0.000	-1.676	-1.676	-0.395
Diag2	Diagonal 2P	49.48	3.616	0.000	3.616	1.309
Diag2	Diagonal 2X	49.52	3.619	0.000	3.619	1.323
Diag2	Diagonal 3P	29.43	2.151	0.000	2.151	0.919
Diag2	Diagonal 3X	27.65	2.021	0.000	2.021	0.509
Diag2	Diagonal 3XY	29.88	2.184	0.000	2.184	0.995
Diag2	Diagonal 3Y	28.40	2.076	0.000	2.076	0.646
Diag3	Diagonal 4P	30.94	2.816	0.000	2.816	1.006
Diag3	Diagonal 4Y	27.48	2.501	0.000	2.501	0.321
Diag2	Diagonal 5P	71.53	5.228	0.000	5.228	1.606
Diag2	Diagonal 5X	69.38	5.071	0.000	5.071	1.333
Diag2	Diagonal 5XY	70.31	5.139	0.000	5.139	1.476
Diag2	Diagonal 5Y	71.29	5.211	0.000	5.211	1.509
Diag3	Diagonal 6P	31.12	2.832	0.000	2.832	1.011
Diag3	Diagonal 6Y	30.03	2.733	0.000	2.733	1.002
Inner1	g60P	5.02	0.000	-0.457	-0.229	-0.457
Inner1	g60X	7.32	0.447	-0.013	-0.013	0.447
Inner1	g61P	3.24	0.000	-0.295	-0.068	-0.295
Inner1	g61X	3.93	0.240	0.000	0.061	0.240
Inner1	g62P	4.95	0.302	0.000	0.302	0.038
Inner1	g62X	6.46	0.394	0.000	0.394	0.067
Inner1	g63P	7.51	0.000	-0.684	-0.297	-0.684
Inner1	g63X	8.15	0.497	0.000	0.060	0.497
Inner2	g64P	35.29	0.000	-0.361	-0.361	0.000
Inner2	g64X	11.80	0.381	-0.121	-0.121	0.381
Diag2	Diagonal 7P	59.04	4.315	0.000	4.315	1.313
Diag2	Diagonal 7X	57.42	4.197	0.000	4.197	1.224
Diag2	Diagonal 7XY	58.19	4.253	0.000	4.253	1.342
Diag2	Diagonal 7Y	58.85	4.301	0.000	4.301	1.234
Diag2	Diagonal 8P	40.02	2.925	0.000	2.925	0.785
Diag2	Diagonal 8X	38.95	2.847	0.000	2.847	0.764
Diag2	Diagonal 8XY	39.47	2.885	0.000	2.885	0.845
Diag2	Diagonal 8Y	39.89	2.916	0.000	2.916	0.730

*** Analysis Results for Load Case No. 1 "NESC Heavy" - Number of iterations in SAPS 10

Equilibrium Joint Positions and Rotations for Load Case "NESC Heavy":

Joint Label	X-Displ (ft)	Y-Displ (ft)	Z-Displ (ft)	X-Rot (deg)	Y-Rot (deg)	Z-Rot (deg)	X-Pos (ft)	Y-Pos (ft)	Z-Pos (ft)
1P	0.01209	0.2029	0.002771	-0.3425	0.0215	0.0496	0.01209	-1.797	78.25
2P	0.01016	0.1745	0.002172	-0.3539	0.0162	0.0464	2.01	-1.826	73.25
7P	0.003528	0.06998	0.0004356	-0.2353	0.0037	0.0415	2.004	-1.93	54.25
8P	0.002526	0.05329	-0.0003932	-0.1972	0.0266	0.0449	2.003	-1.947	50
9P	0	0	0	0.0000	0.0000	0.0000	10	-10	0
15P	0.02255	0.2026	0.07263	-0.3262	0.0220	0.0500	0.02255	-13.8	78.32
16P	0.01718	0.1733	0.04448	-0.2717	0.0217	0.0504	0.01718	-9.827	73.29
17P	0.01604	0.1128	-0.1418	1.1562	0.0206	0.0467	0.01604	-13.89	62.61
18P	0.009726	0.06909	0.03242	-0.2226	0.0162	0.0440	0.009726	-9.931	54.28
19P	-0.2854	0.09933	-0.03	0.0000	0.0000	0.0000	1.715	3.849	64.47
1X	0.008613	0.2034	-0.02151	-0.3547	0.0213	0.0497	0.008613	2.203	78.23
2X	0.007008	0.1741	-0.0217	-0.3604	0.0253	0.0472	2.007	2.174	73.23
2XY	0.006519	0.1706	-0.02019	-0.3601	0.0160	0.0503	-1.993	2.171	73.23
2Y	0.01024	0.171	0.003693	-0.3524	0.0287	0.0512	-1.99	-1.829	73.25
7X	0.001002	0.06993	-0.01538	-0.2541	0.0358	0.0395	2.001	2.07	54.23
7XY	0.0003182	0.06687	-0.01428	-0.2522	-0.0051	0.0432	-2	2.067	54.24
7Y	0.003822	0.06697	0.001552	-0.2344	0.0301	0.0422	-1.996	-1.933	54.25
8X	-0.0004563	0.05326	-0.01369	-0.1850	-0.0045	0.0396	2	2.053	49.99
8XY	-0.0002793	0.05033	-0.01271	-0.1844	0.0289	0.0345	-2	2.05	49.99
8Y	0.002438	0.05036	0.0006385	-0.1965	0.0039	0.0318	-1.998	-1.95	50
9X	0	0	0	0.0000	0.0000	0.0000	10	10	0
9XY	0	0	0	0.0000	0.0000	0.0000	-10	10	0
9Y	0	0	0	0.0000	0.0000	0.0000	-10	-10	0
15X	-0.001836	0.2041	-0.09935	-0.3797	0.0208	0.0498	-0.001836	14.2	78.15
16X	-0.0002116	0.1718	-0.0775	-0.4273	0.0209	0.0504	-0.0002116	10.17	73.17
17X	-0.00677	0.1053	-0.3002	-1.8233	0.0180	0.0476	-0.00677	14.11	62.45
18X	-0.005533	0.06785	-0.05813	-0.3411	0.0160	0.0457	-0.005533	10.07	54.19
19X	-0.2805	0.1443	0.01146	0.0000	0.0000	0.0000	1.719	-3.606	64.51
19XY	0.2973	0.1415	0.01258	0.0000	0.0000	0.0000	-1.703	-3.608	64.51
19Y	0.29	0.09648	-0.02877	0.0000	0.0000	0.0000	-1.71	3.846	64.47
3S	0.008965	0.1524	0.002235	-0.3554	0.0271	0.0460	2.009	-1.848	69.75
4S	0.007237	0.1313	0.002132	-0.3448	0.0205	0.0458	2.007	-1.869	66.25
5S	0.006468	0.1119	0.001968	-0.2560	0.0150	0.0455	2.006	-1.888	62.75
6S	0.00401	0.08907	0.001331	-0.3004	0.0253	0.0434	2.004	-1.911	58.5
10S	0.0002398	0.03813	0.0002859	-0.1205	0.0179	0.0462	2.96	-2.922	44
11S	0.0009934	0.02691	0.0009134	-0.0846	0.0055	0.0406	4.001	-3.973	37.5
12S	6.203e-005	0.01933	0.0008442	-0.0664	0.0132	0.0289	5.04	-5.021	31
13S	2.054e-005	0.01324	0.0008299	-0.0400	0.0046	0.0219	6.027	-6.014	24.83
14S	-0.0001748	0.00961	0.0003593	-0.0318	0.0050	0.0146	7.2	-7.19	17.5
3X	0.005654	0.1524	-0.02118	-0.3470	0.0146	0.0462	2.006	2.152	69.73
3XY	0.00541	0.1489	-0.01972	-0.3460	0.0262	0.0492	-1.995	2.149	69.73
3Y	0.008757	0.1491	0.003703	-0.3543	0.0165	0.0496	-1.991	-1.851	69.75
4X	0.004834	0.132	-0.0204	-0.3210	0.0252	0.0450	2.005	2.132	66.23
4XY	0.003797	0.1286	-0.01898	-0.3194	0.0147	0.0483	-1.996	2.129	66.23
4Y	0.007941	0.1279	0.003544	-0.3438	0.0207	0.0479	-1.992	-1.872	66.25
5X	0.003262	0.1116	-0.01932	-0.3716	0.0035	0.0441	2.003	2.112	62.73
5XY	0.003034	0.1084	-0.01797	-0.3708	0.0341	0.0472	-1.997	2.108	62.73
5Y	0.006275	0.1086	0.003309	-0.2546	0.0247	0.0462	-1.994	-1.891	62.75
6X	0.003472	0.0898	-0.01755	-0.2654	0.0135	0.0419	2.003	2.09	58.48
6XY	0.0002088	0.08661	-0.01631	-0.2641	0.0206	0.0451	-2	2.087	58.48

6Y	0.005919	0.08597	0.002573	-0.2987	0.0116	0.0443	-1.994	-1.914	58.5
10X	0.0005983	0.03925	-0.01296	-0.1113	-0.0047	0.0407	2.961	2.999	43.99
10XY	-0.004598	0.03503	-0.01181	-0.1142	0.0233	0.0222	-2.965	2.995	43.99
10Y	0.003141	0.03403	0.001607	-0.1194	0.0051	0.0191	-2.957	-2.926	44
11X	-0.002962	0.02763	-0.01228	-0.0922	0.0217	0.0364	3.997	4.028	37.49
11XY	-0.004282	0.02216	-0.01095	-0.0925	-0.0016	0.0148	-4.004	4.022	37.49
11Y	0.001148	0.02174	0.0024	-0.0879	0.0125	0.0127	-3.999	-3.978	37.5
12X	-0.004427	0.0193	-0.01102	-0.0573	-0.0064	0.0259	5.036	5.059	30.99
12XY	-0.005768	0.01306	-0.009429	-0.0589	0.0223	0.0131	-5.046	5.053	30.99
12Y	0.001133	0.01282	0.002533	-0.0655	-0.0002	0.0110	-5.039	-5.027	31
13X	-0.005199	0.01433	-0.00917	-0.0393	0.0156	0.0213	6.022	6.042	24.82
13XY	-0.007663	0.00696	-0.007465	-0.0473	0.0145	0.0100	-6.035	6.034	24.82
13Y	0.0005798	0.006274	0.002508	-0.0477	0.0048	0.0072	-6.027	-6.021	24.83
14X	-0.007987	0.009296	-0.007471	-0.0388	-0.0024	0.0111	7.192	7.209	17.49
14XY	-0.007984	0.001216	-0.005524	-0.0265	-0.0099	0.0027	-7.208	7.201	17.49
14Y	0.0002396	0.00127	0.002192	-0.0233	0.0005	0.0039	-7.2	-7.199	17.5

Joint Support Reactions for Load Case "NESC Heavy":

Joint Label	X Force (kips)	X Usage %	Y Force (kips)	Y Usage %	H-Shear Usage %	Z Force (kips)	Comp. Usage %	Uplift Usage %	Result. Force (kips)	Result. Usage %	X Moment (ft-k)	X-M. Usage %	Y Moment (ft-k)	Y-M. Usage %	H-Bend-M Usage %	Z Moment (ft-k)	Z-M. Usage %	Max. Usage %
9P	2.66	0.0	-3.11	0.0	0.0	12.31	0.0	0.0	12.97	0.0	0.21	0.0	0.0	0.0	0.0	0.01	0.0	0.0
9X	-6.04	0.0	-6.68	0.0	0.0	-42.09	0.0	0.0	43.04	0.0	0.14	0.0	0.3	0.0	0.0	0.05	0.0	0.0
9XY	6.16	0.0	-5.84	0.0	0.0	-38.72	0.0	0.0	39.64	0.0	-0.08	0.0	0.2	0.0	0.0	0.04	0.0	0.0
9Y	-2.78	0.0	-2.44	0.0	0.0	13.88	0.0	0.0	14.37	0.0	-0.05	0.0	0.0	0.0	0.0	0.01	0.0	0.0

Joint Displacements, Loads and Member Forces on Joints for Load Case "NESC Heavy":

Joint Label	X External Load (kips)	Y External Load (kips)	Z External Load (kips)	X Member Force (kips)	Y Member Force (kips)	Z Member Force (kips)	X Disp. (ft)	Y Disp. (ft)	Z Disp. (ft)
1P	0.0000	0.0137	-0.1245	-0.0000	-0.0137	0.1245	0.0121	0.2029	0.0028
2P	-1.0620	1.5598	-1.5646	1.0620	-1.5598	1.5646	0.0102	0.1745	0.0022
7P	0.0000	0.0978	-0.1997	-0.0000	-0.0978	0.1997	0.0035	0.0700	0.0004
8P	0.0000	0.2913	-0.6945	0.0000	-0.2913	0.6945	0.0025	0.0533	-0.0004
9P	0.0000	0.1893	-0.2563	-2.6616	2.9217	12.5616	0.0000	0.0000	0.0000
15P	0.0000	0.8518	-1.2865	-0.0000	-0.8518	1.2865	0.0225	0.2026	0.0726
16P	0.0000	0.9335	-1.9328	-0.0000	-0.9335	1.9328	0.0172	0.1733	0.0445
17P	0.0000	0.9399	-1.9852	-0.0000	-0.9399	1.9852	0.0160	0.1128	-0.1418
18P	0.0000	0.9456	-1.9420	-0.0000	-0.9456	1.9420	0.0097	0.0691	0.0324
19P	0.0000	0.0000	-0.0157	-0.0000	-0.0000	0.0157	-0.2854	0.0993	-0.0300
1X	0.0000	0.0000	-0.1245	-0.0000	-0.0000	0.1245	0.0086	0.2034	-0.0215
2X	1.0850	1.4860	-4.9756	-1.0850	-1.4860	4.9756	0.0070	0.1741	-0.0217
2XY	-1.1120	1.1390	-4.0016	1.1120	-1.1390	4.0016	0.0065	0.1706	-0.0202
2Y	1.0890	1.2148	-0.5996	-1.0890	-1.2148	0.5996	0.0102	0.1710	0.0037
7X	0.0000	0.0000	-0.1997	-0.0000	-0.0000	0.1997	0.0010	0.0699	-0.0154
7XY	0.0000	0.0000	-0.1997	-0.0000	0.0000	0.1997	0.0003	0.0669	-0.0143
7Y	0.0000	0.0978	-0.1997	-0.0000	-0.0978	0.1997	0.0038	0.0670	0.0016
8X	0.0000	0.1820	-0.6945	0.0000	-0.1820	0.6945	-0.0005	0.0533	-0.0137
8XY	0.0000	0.0000	-0.1945	0.0000	-0.0000	0.1945	-0.0003	0.0503	-0.0127
8Y	0.0000	0.1093	-0.1945	0.0000	-0.1093	0.1945	0.0024	0.0504	0.0006
9X	0.0000	0.0000	-0.2563	6.0397	6.6814	-41.8292	0.0000	0.0000	0.0000
9XY	0.0000	0.0000	-0.2563	-6.1593	5.8444	-38.4679	0.0000	0.0000	0.0000
9Y	0.0000	0.1893	-0.2563	2.7812	2.2530	14.1396	0.0000	0.0000	0.0000
15X	0.0000	0.7990	-1.2875	0.0000	-0.7990	1.2875	-0.0018	0.2041	-0.0994

16X	0.0000	0.9060	-1.9338	0.0000	-0.9060	1.9338	-0.0002	0.1718	-0.0775
17X	0.0000	0.9060	-1.9862	0.0000	-0.9060	1.9862	-0.0068	0.1053	-0.3002
18X	0.0000	0.9060	-1.9430	0.0000	-0.9060	1.9430	-0.0055	0.0679	-0.0581
19X	0.0000	0.0169	-0.0157	-0.0000	-0.0169	0.0157	-0.2805	0.1443	0.0115
19XY	0.0000	0.0169	-0.0157	0.0000	-0.0169	0.0157	0.2973	0.1415	0.0126
19Y	0.0000	0.0000	-0.0157	0.0000	-0.0000	0.0157	0.2900	0.0965	-0.0288
3S	0.0000	0.0659	-0.0958	0.0000	-0.0659	0.0958	0.0090	0.1524	0.0022
4S	0.0000	0.2383	-0.6277	-0.0000	-0.2383	0.6277	0.0072	0.1313	0.0021
5S	0.3080	-0.2315	-0.4026	-0.3080	0.2315	0.4026	0.0065	0.1119	0.0020
6S	0.0000	0.3118	-0.7050	0.0000	-0.3118	0.7050	0.0040	0.0891	0.0013
10S	0.0000	0.3552	-0.8566	0.0000	-0.3552	0.8566	0.0002	0.0381	0.0003
11S	0.0000	0.1292	-0.2097	0.0000	-0.1292	0.2097	0.0010	0.0269	0.0009
12S	0.0000	0.4767	-1.1340	0.0000	-0.4767	1.1340	0.0001	0.0193	0.0008
13S	0.0000	0.1913	-0.3076	-0.0000	-0.1913	0.3076	0.0000	0.0132	0.0008
14S	0.0000	0.9711	-2.2552	-0.0000	-0.9711	2.2552	-0.0002	0.0096	0.0004
3X	0.0000	0.0000	-0.0958	0.0000	-0.0000	0.0958	0.0057	0.1524	-0.0212
3XY	0.0000	0.0000	-0.0958	0.0000	-0.0000	0.0958	0.0054	0.1489	-0.0197
3Y	0.0000	0.0659	-0.0958	0.0000	-0.0659	0.0958	0.0088	0.1491	0.0037
4X	0.0000	0.1850	-0.6277	-0.0000	-0.1850	0.6277	0.0048	0.1320	-0.0204
4XY	0.0000	0.0000	-0.1187	0.0000	0.0000	0.1187	0.0038	0.1286	-0.0190
4Y	0.0000	0.0533	-0.1187	0.0000	-0.0533	0.1187	0.0079	0.1279	0.0035
5X	-0.3330	-0.3740	-4.5006	0.3330	0.3740	4.5006	0.0033	0.1116	-0.0193
5XY	0.3350	-0.3620	-4.1236	-0.3350	0.3620	4.1236	0.0030	0.1084	-0.0180
5Y	-0.3100	-0.2245	-0.0986	0.3100	0.2245	0.0986	0.0063	0.1086	0.0033
6X	0.0000	0.2040	-0.7050	0.0000	-0.2040	0.7050	0.0035	0.0898	-0.0175
6XY	0.0000	0.0000	-0.1450	0.0000	0.0000	0.1450	0.0002	0.0866	-0.0163
6Y	0.0000	0.1078	-0.1450	0.0000	-0.1078	0.1450	0.0059	0.0860	0.0026
10X	0.0000	0.2380	-0.8566	0.0000	-0.2380	0.8566	0.0006	0.0392	-0.0130
10XY	0.0000	0.0000	-0.2016	0.0000	0.0000	0.2016	-0.0046	0.0350	-0.0118
10Y	0.0000	0.1172	-0.2016	0.0000	-0.1172	0.2016	0.0031	0.0340	0.0016
11X	0.0000	0.0000	-0.2097	0.0000	0.0000	0.2097	-0.0030	0.0276	-0.0123
11XY	0.0000	0.0000	-0.2097	0.0000	0.0000	0.2097	-0.0043	0.0222	-0.0110
11Y	0.0000	0.1292	-0.2097	0.0000	-0.1292	0.2097	0.0011	0.0217	0.0024
12X	0.0000	0.3320	-1.1340	0.0000	-0.3320	1.1340	-0.0044	0.0193	-0.0110
12XY	0.0000	0.0000	-0.2200	0.0000	0.0000	0.2200	-0.0058	0.0131	-0.0094
12Y	0.0000	0.1447	-0.2200	0.0000	-0.1447	0.2200	0.0011	0.0128	0.0025
13X	0.0000	0.0000	-0.3076	-0.0000	0.0000	0.3076	-0.0052	0.0143	-0.0092
13XY	0.0000	0.0000	-0.3076	-0.0000	0.0000	0.3076	-0.0077	0.0070	-0.0075
13Y	0.0000	0.1913	-0.3076	-0.0000	-0.1913	0.3076	0.0006	0.0063	0.0025
14X	0.0000	0.6090	-2.2552	-0.0000	-0.6090	2.2552	-0.0080	0.0093	-0.0075
14XY	0.0000	0.0000	-0.5822	-0.0000	-0.0000	0.5822	-0.0080	0.0012	-0.0055
14Y	0.0000	0.3621	-0.5822	-0.0000	-0.3621	0.5822	0.0002	0.0013	0.0022

Crossing Diagonal Check for Load Case "NESC Heavy" (RLOUT controls):

Comp. Member Label	Tens. Member Label	Connect Leg for Comp. Member	Force In Comp. Member (kips)	Force In Tens. Member (kips)	Original Supported L/R Cap. (kips)	RLX	RLY	RLZ	L/R	KL/R	Curve No.	Alternate Unsupported L/R Cap. (kips)	RLOUT	L/R	KL/R	Curve No.
XBrace5X	XBrace5XY	Short only	-0.21	-0.49	30.54	0.750	0.500	0.500	81.77	91.33	2	24.76	1.000	106.12	113.06	3
XBrace5XY	XBrace5X	Short only	-0.49	-0.21	30.54	0.750	0.500	0.500	81.77	91.33	2	24.76	1.000	106.12	113.06	3
XBrace7P	XBrace7Y	Short only	-1.24	-0.99	30.54	0.750	0.500	0.500	81.77	91.33	2	24.76	1.000	106.12	113.06	3
XBrace7X	XBrace7XY	Short only	-0.02	-0.29	30.54	0.750	0.500	0.500	81.77	91.33	2	24.76	1.000	106.12	113.06	3
XBrace7XY	XBrace7X	Short only	-0.29	-0.02	30.54	0.750	0.500	0.500	81.77	91.33	2	24.76	1.000	106.12	113.06	3
XBrace7Y	XBrace7P	Short only	-0.99	-1.24	30.54	0.750	0.500	0.500	81.77	91.33	2	24.76	1.000	106.12	113.06	3
XBrace9X	XBrace9XY	Long only	-0.04	-0.47	28.26	0.500	0.750	0.500	91.51	98.63	2	22.63	1.000	122.01	121.24	6
XBrace9XY	XBrace9X	Long only	-0.47	-0.04	28.26	0.500	0.750	0.500	91.51	98.63	2	22.63	1.000	122.01	121.24	6

XBrace11P	XBrace11Y	Long only	-1.01	-0.65	28.26	0.500	0.750	0.500	91.51	98.63	2	22.63	1.000	122.01	121.24	6
XBrace11XY	XBrace11X	Long only	-0.35	0.06	28.26	0.500	0.750	0.500	91.51	98.63	2	22.63	1.000	122.01	121.24	6
XBrace11Y	XBrace11P	Long only	-0.65	-1.01	28.26	0.500	0.750	0.500	91.51	98.63	2	22.63	1.000	122.01	121.24	6
XBrace13P	XBrace13Y	Short only	-6.08	-5.58	31.38	0.750	0.500	0.500	71.32	83.49	2	26.66	1.000	91.07	105.54	3
XBrace13Y	XBrace13P	Short only	-5.58	-6.08	31.38	0.750	0.500	0.500	71.32	83.49	2	26.66	1.000	91.07	105.54	3
XBrace15P	XBrace15Y	Short only	-3.59	-2.10	14.68	0.791	0.582	0.582	140.10	135.36	5	13.48	1.000	154.56	141.25	6
XBrace15Y	XBrace15P	Short only	-2.10	-3.59	14.68	0.791	0.582	0.582	140.10	135.36	5	13.48	1.000	154.56	141.25	6
XBrace16X	XBrace16XY	Short only	-0.89	-0.86	10.76	0.789	0.578	0.578	169.94	158.09	5	10.21	1.000	188.77	162.29	6
XBrace16XY	XBrace16X	Short only	-0.86	-0.89	10.76	0.789	0.578	0.578	169.94	158.09	5	10.21	1.000	188.77	162.29	6
XBrace19P	XBrace19Y	Short only	-1.35	-0.63	5.61	0.779	0.559	0.559	190.39	190.39	4	4.30	1.000	217.49	217.49	4
XBrace19Y	XBrace19P	Short only	-0.63	-1.35	5.61	0.779	0.559	0.559	190.39	190.39	4	4.30	1.000	217.49	217.49	4
XBrace21X	XBrace21XY	Short only	-0.49	-0.36	9.19	0.772	0.544	0.544	167.61	167.61	4	6.72	1.000	196.03	196.03	4
XBrace21XY	XBrace21X	Short only	-0.36	-0.49	9.19	0.772	0.544	0.544	167.61	167.61	4	6.72	1.000	196.03	196.03	4
XBrace22P	XBrace22X	Short only	-0.12	-0.26	14.79	0.771	0.543	0.543	166.95	166.95	4	10.76	1.000	195.71	195.71	4
XBrace22X	XBrace22P	Short only	-0.26	-0.12	14.79	0.771	0.543	0.543	166.95	166.95	4	10.76	1.000	195.71	195.71	4
XBrace23P	XBrace23Y	Short only	-0.94	-0.27	14.79	0.771	0.543	0.543	166.95	166.95	4	10.76	1.000	195.71	195.71	4
XBrace23Y	XBrace23P	Short only	-0.27	-0.94	14.79	0.771	0.543	0.543	166.95	166.95	4	10.76	1.000	195.71	195.71	4

Summary of Clamp Capacities and Usages for Load Case "NESC Heavy":

Clamp Label	Force (kips)	Input Holding Capacity (kips)	Factored Holding Capacity (kips)	Usage %
Clamp1	1.543	50.00	50.00	3.09
Clamp2	1.515	50.00	50.00	3.03
Clamp3	2.146	50.00	50.00	4.29
Clamp4	2.135	50.00	50.00	4.27
Clamp5	2.196	50.00	50.00	4.39
Clamp6	2.183	50.00	50.00	4.37
Clamp7	2.160	50.00	50.00	4.32
Clamp8	2.144	50.00	50.00	4.29
Clamp9	2.451	50.00	50.00	4.90
Clamp10	0.671	50.00	50.00	1.34
Clamp11	0.771	50.00	50.00	1.54
Clamp12	0.753	50.00	50.00	1.51
Clamp13	0.927	50.00	50.00	1.85
Clamp14	1.230	50.00	50.00	2.46
Clamp15	2.455	50.00	50.00	4.91
Clamp16	5.305	50.00	50.00	10.61
Clamp17	0.654	50.00	50.00	1.31
Clamp18	0.734	50.00	50.00	1.47
Clamp19	0.718	50.00	50.00	1.44
Clamp20	0.889	50.00	50.00	1.78
Clamp21	1.182	50.00	50.00	2.36
Clamp22	2.336	50.00	50.00	4.67
Clamp23	0.557	50.00	50.00	1.11
Clamp24	4.528	50.00	50.00	9.06
Clamp25	1.738	50.00	50.00	3.48
Clamp26	4.307	50.00	50.00	8.61
Clamp27	0.395	50.00	50.00	0.79
Clamp28	4.153	50.00	50.00	8.31
Clamp29	0.130	50.00	50.00	0.26
Clamp30	0.181	50.00	50.00	0.36
Clamp31	0.223	50.00	50.00	0.45
Clamp32	0.233	50.00	50.00	0.47

Clamp33	0.263	50.00	50.00	0.53
Clamp34	0.686	50.00	50.00	1.37
Clamp35	0.119	50.00	50.00	0.24
Clamp36	0.145	50.00	50.00	0.29
Clamp37	0.194	50.00	50.00	0.39
Clamp38	0.202	50.00	50.00	0.40
Clamp39	0.220	50.00	50.00	0.44
Clamp40	0.582	50.00	50.00	1.16
Clamp43	0.096	50.00	50.00	0.19
Clamp44	0.116	50.00	50.00	0.23

*** Analysis Results for Load Case No. 2 "NESC Extreme" - Number of iterations in SAPS 13

Equilibrium Joint Positions and Rotations for Load Case "NESC Extreme":

Joint Label	X-Displ (ft)	Y-Displ (ft)	Z-Displ (ft)	X-Rot (deg)	Y-Rot (deg)	Z-Rot (deg)	X-Pos (ft)	Y-Pos (ft)	Z-Pos (ft)
1P	0.0182	0.4615	0.02242	-0.7994	0.0316	0.1165	0.0182	-1.539	78.27
2P	0.01516	0.3957	0.0216	-0.8257	0.0198	0.1089	2.015	-1.604	73.27
7P	0.005087	0.156	0.01413	-0.5441	-0.0130	0.0912	2.005	-1.844	54.26
8P	0.003912	0.1189	0.01155	-0.4256	0.0571	0.0955	2.004	-1.881	50.01
9P	0	0	0	0.0000	0.0000	0.0000	10	-10	0
15P	0.04285	0.4626	0.1897	-0.7915	0.0340	0.1175	0.04285	-13.54	78.44
16P	0.03203	0.3925	0.1323	-0.7683	0.0332	0.1198	0.03203	-9.607	73.38
17P	0.03226	0.2479	0.002733	0.4611	0.0305	0.1089	0.03226	-13.75	62.75
18P	0.01901	0.1534	0.09752	-0.6215	0.0241	0.0972	0.01901	-9.847	54.35
19P	-0.27	0.2531	-0.0527	0.0000	0.0000	0.0000	1.73	4.003	64.45
1X	0.01005	0.4612	-0.03341	-0.8024	0.0308	0.1164	0.01005	2.461	78.22
2X	0.007966	0.3952	-0.0336	-0.8266	0.0430	0.1070	2.008	2.395	73.22
2XY	0.007097	0.387	-0.03144	-0.8253	0.0129	0.1191	-1.993	2.387	73.22
2Y	0.01591	0.3875	0.02382	-0.8238	0.0511	0.1179	-1.984	-1.613	73.27
7X	-0.000407	0.1559	-0.02142	-0.5538	0.0610	0.0876	2	2.156	54.23
7XY	-0.001596	0.1492	-0.01987	-0.5484	-0.0195	0.0950	-2.002	2.149	54.23
7Y	0.006178	0.1495	0.01577	-0.5413	0.0663	0.0932	-1.994	-1.851	54.27
8X	-0.002407	0.1187	-0.01817	-0.4211	-0.0196	0.0907	1.998	2.119	49.98
8XY	-0.002087	0.1124	-0.01686	-0.4189	0.0460	0.0723	-2.002	2.112	49.98
8Y	0.003647	0.1126	0.01306	-0.4215	-0.0065	0.0714	-1.996	-1.887	50.01
9X	0	0	0	0.0000	0.0000	0.0000	10	10	0
9XY	0	0	0	0.0000	0.0000	0.0000	-10	10	0
9Y	0	0	0	0.0000	0.0000	0.0000	-10	-10	0
15X	-0.0145	0.4604	-0.2028	-0.8060	0.0285	0.1171	-0.0145	14.46	78.05
16X	-0.008859	0.3901	-0.1475	-0.8254	0.0289	0.1190	-0.008859	10.39	73.1
17X	-0.02011	0.2418	-0.366	-2.0298	0.0292	0.1087	-0.02011	14.24	62.38
18X	-0.01459	0.1519	-0.1073	-0.6612	0.0227	0.0999	-0.01459	10.15	54.14
19X	-0.2898	0.3002	0.04283	0.0000	0.0000	0.0000	1.71	-3.45	64.54
19XY	0.3192	0.2941	0.04431	0.0000	0.0000	0.0000	-1.681	-3.456	64.54
19Y	0.2722	0.2462	-0.05055	0.0000	0.0000	0.0000	-1.728	3.996	64.45
3S	0.01354	0.3449	0.02148	-0.8126	0.0472	0.1067	2.014	-1.655	69.77
4S	0.01055	0.2967	0.02085	-0.7809	0.0273	0.1051	2.011	-1.703	66.27
5S	0.009807	0.251	0.01979	-0.6739	0.0366	0.1032	2.01	-1.749	62.77
6S	0.004569	0.1999	0.01732	-0.6543	0.0437	0.0968	2.005	-1.8	58.52
10S	-0.001728	0.08647	0.01147	-0.2584	0.0415	0.0981	2.958	-2.874	44.01
11S	0.001252	0.06115	0.0115	-0.1933	0.0022	0.0865	4.001	-3.939	37.51
12S	-0.000259	0.04378	0.009982	-0.1434	0.0304	0.0613	5.04	-4.996	31.01
13S	-0.0001862	0.03051	0.008302	-0.0897	0.0080	0.0465	6.027	-5.997	24.84
14S	-2.739e-005	0.0215	0.005676	-0.0743	0.0106	0.0302	7.2	-7.179	17.51
3X	0.005973	0.3445	-0.03257	-0.8137	0.0143	0.1051	2.006	2.345	69.72
3XY	0.005909	0.3365	-0.03041	-0.8113	0.0431	0.1147	-1.994	2.336	69.72
3Y	0.01346	0.3369	0.02366	-0.8101	0.0212	0.1139	-1.987	-1.663	69.77
4X	0.005369	0.2967	-0.03107	-0.7580	0.0385	0.1024	2.005	2.297	66.22
4XY	0.003092	0.2888	-0.02886	-0.7526	0.0226	0.1109	-1.997	2.289	66.22
4Y	0.01266	0.2889	0.02294	-0.7759	0.0361	0.1093	-1.987	-1.711	66.27
5X	0.002509	0.2506	-0.0291	-0.7690	0.0107	0.1004	2.003	2.251	62.72
5XY	0.002437	0.2432	-0.02684	-0.7638	0.0483	0.1066	-1.998	2.243	62.72
5Y	0.009778	0.2436	0.02177	-0.6672	0.0256	0.1049	-1.99	-1.756	62.77
6X	0.003766	0.2	-0.02558	-0.6278	0.0137	0.0944	2.004	2.2	58.47
6XY	-0.002629	0.1929	-0.02368	-0.6228	0.0356	0.1004	-2.003	2.193	58.48

6Y	0.01069	0.193	0.01916	-0.6484	0.0156	0.0995	-1.989	-1.807	58.52
10X	0.0004211	0.08678	-0.0177	-0.2525	-0.0164	0.0938	2.96	3.047	43.98
10XY	-0.009046	0.07777	-0.01643	-0.2546	0.0305	0.0435	-2.969	3.038	43.98
10Y	0.007097	0.07789	0.01344	-0.2557	-0.0006	0.0438	-2.953	-2.882	44.01
11X	-0.005586	0.0615	-0.01742	-0.1993	0.0297	0.0827	3.994	4.062	37.48
11XY	-0.007318	0.0504	-0.01594	-0.1971	-0.0093	0.0286	-4.007	4.05	37.48
11Y	0.002545	0.05029	0.01375	-0.1959	0.0281	0.0289	-3.997	-3.95	37.51
12X	-0.007096	0.04339	-0.01584	-0.1351	-0.0179	0.0588	5.033	5.083	30.98
12XY	-0.009694	0.0307	-0.01404	-0.1338	0.0342	0.0256	-5.05	5.071	30.99
12Y	0.002879	0.03088	0.01243	-0.1365	-0.0080	0.0248	-5.037	-5.009	31.01
13X	-0.008348	0.03143	-0.01346	-0.0923	0.0231	0.0468	6.019	6.059	24.82
13XY	-0.01225	0.01728	-0.01135	-0.1004	0.0195	0.0182	-6.039	6.044	24.82
13Y	0.002148	0.01695	0.0107	-0.1004	0.0053	0.0163	-6.025	-6.01	24.84
14X	-0.01261	0.02058	-0.01109	-0.0851	-0.0067	0.0261	7.187	7.221	17.49
14XY	-0.01263	0.005473	-0.00851	-0.0597	-0.0157	0.0064	-7.213	7.205	17.49
14Y	0.001608	0.005777	0.008295	-0.0553	-0.0001	0.0097	-7.198	-7.194	17.51

Joint Support Reactions for Load Case "NESC Extreme":

Joint Label	X Force (kips)	X Usage %	Y Force (kips)	Y Usage %	H-Shear Usage %	Z Force (kips)	Comp. Usage %	Uplift Usage %	Result. Force (kips)	Result. Usage %	X Moment (ft-k)	X-M. Usage %	Y Moment (ft-k)	Y-M. Usage %	H-Bend-M Usage %	Z Moment (ft-k)	Z-M. Usage %	Max. Usage %
9P	11.50	0.0	-12.94	0.0	0.0	57.37	0.0	0.0	59.93	0.0	0.44	0.0	-0.0	0.0	0.0	0.02	0.0	0.0
9X	-9.88	0.0	-11.02	0.0	0.0	-67.62	0.0	0.0	69.22	0.0	0.34	0.0	0.5	0.0	0.0	0.08	0.0	0.0
9XY	9.95	0.0	-9.34	0.0	0.0	-62.43	0.0	0.0	63.90	0.0	-0.07	0.0	0.3	0.0	0.0	0.06	0.0	0.0
9Y	-11.69	0.0	-9.23	0.0	0.0	55.75	0.0	0.0	57.71	0.0	-0.05	0.0	-0.0	0.0	0.0	0.01	0.0	0.0

Joint Displacements, Loads and Member Forces on Joints for Load Case "NESC Extreme":

Joint Label	X External Load (kips)	Y External Load (kips)	Z External Load (kips)	X Member Force (kips)	Y Member Force (kips)	Z Member Force (kips)	X Disp. (ft)	Y Disp. (ft)	Z Disp. (ft)
1P	0.0000	0.0961	-0.0833	0.0000	-0.0961	0.0833	0.0182	0.4615	0.0224
2P	-3.7290	5.1841	4.6917	3.7290	-5.1841	-4.6917	0.0152	0.3957	0.0216
7P	0.0000	0.0961	-0.0833	-0.0000	-0.0961	0.0833	0.0051	0.1560	0.0141
8P	0.0000	0.9541	-0.3976	0.0000	-0.9541	0.3976	0.0039	0.1189	0.0115
9P	0.0000	0.2760	-0.1782	-11.5049	12.6681	57.5494	0.0000	0.0000	0.0000
15P	0.0060	0.6651	-0.3323	-0.0060	-0.6651	0.3323	0.0428	0.4626	0.1897
16P	0.0350	0.9631	-0.7153	-0.0350	-0.9631	0.7153	0.0320	0.3925	0.1323
17P	0.0350	0.9631	-0.7153	-0.0350	-0.9631	0.7153	0.0323	0.2479	0.0027
18P	0.0350	0.9631	-0.7153	-0.0350	-0.9631	0.7153	0.0190	0.1534	0.0975
19P	0.0000	0.0961	-0.0833	-0.0000	-0.0961	0.0833	-0.2700	0.2531	-0.0527
1X	0.0000	0.0961	-0.0833	0.0000	-0.0961	0.0833	0.0100	0.4612	-0.0334
2X	3.7320	5.0921	-7.4933	-3.7320	-5.0921	7.4933	0.0080	0.3952	-0.0336
2XY	-3.8050	4.0571	-7.2223	3.8050	-4.0571	7.2223	0.0071	0.3870	-0.0314
2Y	3.8020	4.1491	4.9417	-3.8020	-4.1491	-4.9417	0.0159	0.3875	0.0238
7X	0.0000	0.0961	-0.0833	0.0000	-0.0961	0.0833	-0.0004	0.1559	-0.0214
7XY	0.0000	0.0961	-0.0833	0.0000	-0.0961	0.0833	-0.0016	0.1492	-0.0199
7Y	0.0000	0.0961	-0.0833	-0.0000	-0.0961	0.0833	0.0062	0.1495	0.0158
8X	0.0000	0.9541	-0.3976	0.0000	-0.9541	0.3976	-0.0024	0.1187	-0.0182
8XY	0.0000	0.3721	-0.2616	0.0000	-0.3721	0.2616	-0.0021	0.1124	-0.0169
8Y	0.0000	0.3721	-0.2616	0.0000	-0.3721	0.2616	0.0036	0.1126	0.0131
9X	0.0000	0.2760	-0.1782	9.8805	10.7405	-67.4458	0.0000	0.0000	0.0000
9XY	0.0000	0.2760	-0.1782	-9.9513	9.0602	-62.2502	0.0000	0.0000	0.0000
9Y	0.0000	0.2760	-0.1782	11.6877	8.9497	55.9296	0.0000	0.0000	0.0000
15X	0.0000	0.6701	-0.3323	-0.0000	-0.6701	0.3323	-0.0145	0.4604	-0.2028

16X	0.0000	0.9691	-0.7153	-0.0000	-0.9691	0.7153	-0.0089	0.3901	-0.1475
17X	0.0000	0.9691	-0.7153	0.0000	-0.9691	0.7153	-0.0201	0.2418	-0.3660
18X	0.0000	0.9691	-0.7153	-0.0000	-0.9691	0.7153	-0.0146	0.1519	-0.1073
19X	0.0000	0.0961	-0.0833	-0.0000	-0.0961	0.0833	-0.2898	0.3002	0.0428
19XY	0.0000	0.0961	-0.0833	0.0000	-0.0961	0.0833	0.3192	0.2941	0.0443
19Y	0.0000	0.0961	-0.0833	0.0000	-0.0961	0.0833	0.2722	0.2462	-0.0506
3S	0.0000	0.0961	-0.0833	0.0000	-0.0961	0.0833	0.0135	0.3449	0.0215
4S	0.0000	0.6881	-0.2213	-0.0000	-0.6881	0.2213	0.0105	0.2967	0.0209
5S	1.1500	-1.0899	6.1127	-1.1500	1.0899	-6.1127	0.0098	0.2510	0.0198
6S	0.0000	0.7491	-0.2353	0.0000	-0.7491	0.2353	0.0046	0.1999	0.0173
10S	0.0000	1.0390	-0.3562	0.0000	-1.0390	0.3562	-0.0017	0.0865	0.0115
11S	0.0000	0.2760	-0.1782	0.0000	-0.2760	0.1782	0.0013	0.0611	0.0115
12S	0.0000	1.3400	-0.4262	0.0000	-1.3400	0.4262	-0.0003	0.0438	0.0100
13S	0.0000	0.2760	-0.1782	0.0000	-0.2760	0.1782	-0.0002	0.0305	0.0083
14S	0.0000	2.2230	-0.6322	0.0000	-2.2230	0.6322	-0.0000	0.0215	0.0057
3X	0.0000	0.0961	-0.0833	-0.0000	-0.0961	0.0833	0.0060	0.3445	-0.0326
3XY	0.0000	0.0961	-0.0833	-0.0000	-0.0961	0.0833	0.0059	0.3365	-0.0304
3Y	0.0000	0.0961	-0.0833	0.0000	-0.0961	0.0833	0.0135	0.3369	0.0237
4X	0.0000	0.6881	-0.2213	-0.0000	-0.6881	0.2213	0.0054	0.2967	-0.0311
4XY	0.0000	0.0961	-0.0833	0.0000	-0.0961	0.0833	0.0031	0.2888	-0.0289
4Y	0.0000	0.0961	-0.0833	0.0000	-0.0961	0.0833	0.0127	0.2889	0.0229
5X	-1.1590	-1.1959	-8.4423	1.1590	1.1959	8.4423	0.0025	0.2506	-0.0291
5XY	1.1650	-1.1699	-0.9003	-1.1650	1.1699	0.9003	0.0024	0.2432	-0.0268
5Y	-1.1550	-1.0649	6.1077	1.1550	1.0649	-6.1077	0.0098	0.2436	0.0218
6X	0.0000	0.7491	-0.2353	0.0000	-0.7491	0.2353	0.0038	0.2000	-0.0256
6XY	0.0000	0.0961	-0.0833	0.0000	-0.0961	0.0833	-0.0026	0.1929	-0.0237
6Y	0.0000	0.0961	-0.0833	-0.0000	-0.0961	0.0833	0.0107	0.1930	0.0192
10X	0.0000	1.0390	-0.3562	0.0000	-1.0390	0.3562	0.0004	0.0868	-0.0177
10XY	0.0000	0.2760	-0.1782	0.0000	-0.2760	0.1782	-0.0090	0.0778	-0.0164
10Y	0.0000	0.2760	-0.1782	0.0000	-0.2760	0.1782	0.0071	0.0779	0.0134
11X	0.0000	0.2760	-0.1782	0.0000	-0.2760	0.1782	-0.0056	0.0615	-0.0174
11XY	0.0000	0.2760	-0.1782	0.0000	-0.2760	0.1782	-0.0073	0.0504	-0.0159
11Y	0.0000	0.2760	-0.1782	0.0000	-0.2760	0.1782	0.0025	0.0503	0.0137
12X	0.0000	1.3400	-0.4262	0.0000	-1.3400	0.4262	-0.0071	0.0434	-0.0158
12XY	0.0000	0.2760	-0.1782	0.0000	-0.2760	0.1782	-0.0097	0.0307	-0.0140
12Y	0.0000	0.2760	-0.1782	0.0000	-0.2760	0.1782	0.0029	0.0309	0.0124
13X	0.0000	0.2760	-0.1782	0.0000	-0.2760	0.1782	-0.0083	0.0314	-0.0135
13XY	0.0000	0.2760	-0.1782	0.0000	-0.2760	0.1782	-0.0123	0.0173	-0.0114
13Y	0.0000	0.2760	-0.1782	0.0000	-0.2760	0.1782	0.0021	0.0169	0.0107
14X	0.0000	2.2230	-0.6322	0.0000	-2.2230	0.6322	-0.0126	0.0206	-0.0111
14XY	0.0000	0.2760	-0.1782	0.0000	-0.2760	0.1782	-0.0126	0.0055	-0.0085
14Y	0.0000	0.2760	-0.1782	0.0000	-0.2760	0.1782	0.0016	0.0058	0.0083

Crossing Diagonal Check for Load Case "NESC Extreme" (RLOUT controls):

Comp. Member Label	Tens. Member Label	Connect Leg for Comp. Member	Force In Comp. Member (kips)	Force In Tens. Member (kips)	Original Supported L/R Cap. (kips)	RLX	RLY	RLZ	L/R	KL/R	Curve No.	Alternate Unsupported L/R Cap. (kips)	RLOUT	L/R	KL/R	Curve No.
XBrace5X	XBrace5XY	Short only	-0.06	-1.19	30.54	0.750	0.500	0.500	81.77	91.33	2	24.76	1.000	106.12	113.06	3
XBrace5XY	XBrace5X	Short only	-1.19	-0.06	30.54	0.750	0.500	0.500	81.77	91.33	2	24.76	1.000	106.12	113.06	3
XBrace7P	XBrace7Y	Short only	-1.90	-0.90	30.54	0.750	0.500	0.500	81.77	91.33	2	24.76	1.000	106.12	113.06	3
XBrace7Y	XBrace7P	Short only	-0.90	-1.90	30.54	0.750	0.500	0.500	81.77	91.33	2	24.76	1.000	106.12	113.06	3
XBrace11P	XBrace11Y	Long only	-1.54	-0.04	28.26	0.500	0.750	0.500	91.51	98.63	2	22.63	1.000	122.01	121.24	6
XBrace11Y	XBrace11P	Long only	-0.04	-1.54	28.26	0.500	0.750	0.500	91.51	98.63	2	22.63	1.000	122.01	121.24	6
XBrace13P	XBrace13Y	Short only	-11.86	-10.14	31.38	0.750	0.500	0.500	71.32	83.49	2	26.66	1.000	91.07	105.54	3
XBrace13Y	XBrace13P	Short only	-10.14	-11.86	31.38	0.750	0.500	0.500	71.32	83.49	2	26.66	1.000	91.07	105.54	3

XBrace15P	XBrace15Y	Short only	-7.05	-3.02	14.68	0.791	0.582	0.582	140.10	135.36	5	13.48	1.000	154.56	141.25	6
XBrace15Y	XBrace15P	Short only	-3.02	-7.05	14.68	0.791	0.582	0.582	140.10	135.36	5	13.48	1.000	154.56	141.25	6
XBrace16X	XBrace16XY	Short only	-3.12	-1.87	10.76	0.789	0.578	0.578	169.94	158.09	5	10.21	1.000	188.77	162.29	6
XBrace16XY	XBrace16X	Short only	-1.87	-3.12	10.76	0.789	0.578	0.578	169.94	158.09	5	10.21	1.000	188.77	162.29	6
XBrace19P	XBrace19Y	Short only	-2.70	-0.96	5.61	0.779	0.559	0.559	190.39	190.39	4	4.30	1.000	217.49	217.49	4
XBrace19Y	XBrace19P	Short only	-0.96	-2.70	5.61	0.779	0.559	0.559	190.39	190.39	4	4.30	1.000	217.49	217.49	4
XBrace21X	XBrace21XY	Short only	-0.68	-1.30	9.19	0.772	0.544	0.544	167.61	167.61	4	6.72	1.000	196.03	196.03	4
XBrace21XY	XBrace21X	Short only	-1.30	-0.68	9.19	0.772	0.544	0.544	167.61	167.61	4	6.72	1.000	196.03	196.03	4
XBrace23P	XBrace23Y	Short only	-1.75	-0.50	14.79	0.771	0.543	0.543	166.95	166.95	4	10.76	1.000	195.71	195.71	4
XBrace23Y	XBrace23P	Short only	-0.50	-1.75	14.79	0.771	0.543	0.543	166.95	166.95	4	10.76	1.000	195.71	195.71	4

Summary of Clamp Capacities and Usages for Load Case "NESC Extreme":

Clamp Label	Force (kips)	Input Holding Capacity (kips)	Factored Holding Capacity (kips)	Usage %
Clamp1	0.744	50.00	50.00	1.49
Clamp2	0.748	50.00	50.00	1.50
Clamp3	1.200	50.00	50.00	2.40
Clamp4	1.204	50.00	50.00	2.41
Clamp5	1.200	50.00	50.00	2.40
Clamp6	1.204	50.00	50.00	2.41
Clamp7	1.200	50.00	50.00	2.40
Clamp8	1.204	50.00	50.00	2.41
Clamp9	7.924	50.00	50.00	15.85
Clamp10	0.723	50.00	50.00	1.45
Clamp11	0.785	50.00	50.00	1.57
Clamp12	1.034	50.00	50.00	2.07
Clamp13	1.098	50.00	50.00	2.20
Clamp14	1.406	50.00	50.00	2.81
Clamp15	2.311	50.00	50.00	4.62
Clamp16	9.798	50.00	50.00	19.60
Clamp17	0.723	50.00	50.00	1.45
Clamp18	0.785	50.00	50.00	1.57
Clamp19	1.034	50.00	50.00	2.07
Clamp20	1.098	50.00	50.00	2.20
Clamp21	1.406	50.00	50.00	2.81
Clamp22	2.311	50.00	50.00	4.62
Clamp23	6.315	50.00	50.00	12.63
Clamp24	8.605	50.00	50.00	17.21
Clamp25	7.489	50.00	50.00	14.98
Clamp26	9.116	50.00	50.00	18.23
Clamp27	6.306	50.00	50.00	12.61
Clamp28	1.881	50.00	50.00	3.76
Clamp29	0.127	50.00	50.00	0.25
Clamp30	0.127	50.00	50.00	0.25
Clamp31	0.455	50.00	50.00	0.91
Clamp32	0.329	50.00	50.00	0.66
Clamp33	0.329	50.00	50.00	0.66
Clamp34	0.329	50.00	50.00	0.66
Clamp35	0.127	50.00	50.00	0.25
Clamp36	0.127	50.00	50.00	0.25
Clamp37	0.455	50.00	50.00	0.91
Clamp38	0.329	50.00	50.00	0.66
Clamp39	0.329	50.00	50.00	0.66

Clamp40	0.329	50.00	50.00	0.66
Clamp43	0.127	50.00	50.00	0.25
Clamp44	0.127	50.00	50.00	0.25

*** Overall summary for all load cases - Usage = Maximum Stress / Allowable Stress
Printed capacities do not include the strength factor entered for each load case.
The Group Summary reports on the member and load case that resulted in maximum usage
which may not necessarily be the same as that which produces maximum force.

Group Summary (Compression Portion):

Group Label	Group Desc.	Angle Type	Angle Size	Steel Strength (ksi)	Max Usage %	Usage Cont-rol	Max Use In Comp. %	Comp. Control Member	Comp. Force (kips)	Comp. Control Load Case	L/R Capacity (kips)	Comp. Connect. Shear Capacity (kips)	Comp. Connect. Bearing Capacity (kips)	RLX	RLY	RLZ	L/R Comp.	KL/R Comp.	Length Comp. Member (ft)	Curve No.	No. Of Bolts
Leg1	Leg1	SAU	2.5X2X0.1875	33.0	14.86	Comp	14.86	Leg1XY	-1.504	NESC Hea	10.122	18.200	21.094	1.000	1.000	1.000	151.34	151.34	5.385	4	2
Leg2	Leg2	SAE	4X4X0.3125	33.0	96.10	Tens	92.23	Leg6X	-64.295	NESC Ext	69.710	109.200	105.469	1.000	1.000	1.000	64.48	64.48	4.250	1	6
Leg3	Leg3	SAE	4X4X0.4375	33.0	96.12	Comp	96.12	Leg9X	-73.586	NESC Ext	76.554	0.000	0.000	1.000	1.000	1.000	101.88	101.88	6.664	1	0
Leg4	Leg4	SAE	5X5X0.375	33.0	96.54	Comp	96.54	Leg13X	-70.281	NESC Ext	78.526	72.800	168.750	0.500	0.500	0.500	108.74	108.74	17.942	1	8
XBrace1	XBrace1	SAE	1.75X1.75X0.1875	33.0	55.44	Tens	52.82	XBrace2P	-7.708	NESC Ext	14.594	18.200	21.094	0.750	0.500	0.500	92.98	99.73	5.315	2	2
XBrace2	XBrace2	SAU	3X2X0.25	33.0	44.57	Tens	36.05	XBrace10P	-9.842	NESC Ext	28.258	27.300	42.187	0.500	0.750	0.500	91.51	98.63	5.836	2	3
XBrace3	XBrace3	SAE	2.5X2.5X0.25	33.0	65.18	Comp	65.18	XBrace13P	-11.862	NESC Ext	26.663	18.200	28.125	1.000	0.500	0.500	91.07	105.54	5.836	3	2
XBrace4	XBrace4	SAE	2X2X0.25	33.0	54.78	Comp	54.78	XBrace14Y	-8.045	NESC Ext	14.684	18.200	28.125	0.791	0.582	0.582	140.10	135.36	7.844	5	2
XBrace5	XBrace5	SAE	2X2X0.1875	33.0	62.79	Cross	62.79	XBrace19P	-2.697	NESC Ext	4.296	9.100	10.547	1.000	0.559	0.559	217.49	217.49	11.183	4	1
XBrace6	XBrace6	SAE	2.5X2.5X0.1875	33.0	23.73	Tens	20.85	XBrace20XY	-1.897	NESC Ext	9.190	9.100	10.547	0.772	0.544	0.544	167.61	167.61	12.709	4	1
XBrace7	XBrace7	SAE	3X3X0.25	33.0	19.27	Comp	19.27	XBrace23P	-1.754	NESC Ext	10.760	9.100	14.062	1.000	0.543	0.543	195.71	195.71	15.168	4	1
XBrace8	XBrace8	SAU	2X1.5X0.1875	33.0	39.51	Tens	0.00	XBrace25XY	0.000		0.945	18.200	21.094	0.577	0.788	0.577	531.06	433.27	24.697	5	2
Horz1	Horizontal 1	SAE	2X2X0.1875	33.0	59.13	Tens	41.92	Horz1X	-3.814	NESC Ext	13.406	9.100	10.547	1.000	1.000	1.000	121.83	121.83	4.000	4	1
Horz2	Horizontal 2	SAU	3X2.5X0.25	33.0	47.17	Comp	47.17	Horz7X	-4.292	NESC Ext	11.214	9.100	14.062	1.000	0.500	0.500	182.86	182.86	14.400	4	1
Diag1	Diagonal 1	SAU	3.5X2.5X0.25	33.0	8.61	Comp	8.61	Diagonal 1X	-1.685	NESC Hea	19.584	27.300	42.187	1.000	0.500	0.500	145.07	145.07	13.153	4	3
Diag2	Diagonal 2	Bar	2x3/16	33.0	71.53	Tens	0.00	Diagonal 8Y	0.000		11.400	9.100	10.547	1.000	1.000	1.000	29.70	52.27	2.475	2	1
Diag3	Diagonal 3	Bar	2x1/4	33.0	31.12	Tens	0.00	Diagonal 6Y	0.000		14.428	9.100	14.062	1.000	1.000	1.000	48.00	66.00	4.000	2	1
Arm1	Arm1	DAL	2.5X2X0.1875	33.0	70.01	Tens	0.00	Arm2P	0.000		40.905	9.100	21.094	1.000	1.000	1.000	60.53	90.26	4.000	3	1
Arm2	Arm2	SAE	2.5X2.5X0.25	33.0	24.71	Comp	24.71	Arm4Y	-2.248	NESC Hea	25.851	9.100	14.062	1.000	1.000	1.000					

																97.76	108.88	4.000	3	1
Arm3	**Arm3**	**SAU**	**3.5X2.5X0.25**	**33.0**	**30.89**	**Comp**	**30.89**	**Arm5P**	**-5.623NESC Hea**	**24.070**	**18.200**	**28.125**	**1.000**	**0.500**	**0.500**	**134.18**	**130.84**	**12.166**	**5**	**2**

A potentially damaging moment exists in the following members (make sure your system is well triangulated to minimize moments): Arm5P Arm5X Arm5XY Arm5Y ??

Inner1	Inner1	SAE	1.75X1.75X0.1875	33.0	8.15	Tens	7.51	g63P	-0.684NESC Ext	13.392	9.100	10.547	0.750	0.500	0.500	98.95	109.48	5.657	3	1
Inner2	Inner1	SAU	2X1.5X0.1875	33.0	35.29	Comp	35.29	g64P	-0.361NESC Hea	1.023	9.100	10.547	0.500	0.750	0.500	416.55	416.55	20.365	4	1
XBrace1R	XBrace1R	SAE	2X2X0.3125	36.0	47.17	Comp	47.17	XBrace6P	-8.584NESC Ext	30.542	18.200	33.984	0.750	0.500	0.500	81.77	91.33	5.315	2	2
Horz3	Horizontal 3	SAE	2X2X0.25	33.0	89.45	Tens	81.28	Horz3X	-7.397NESC Ext	17.545	9.100	14.062	1.000	1.000	1.000	122.76	122.76	4.000	4	1

Group Summary (Tension Portion):

Group Label	**Group Desc.**	**Angle Type**	**Angle Size**	**Steel Strength (ksi)**	**Max Usage %**	**Usage Control**	**Max Use In Tens. %**	**Tension Control Member**	**Tension Force (kips)**	**Tension Control Load Case**	**Net Section Capacity (kips)**	**Tension Connect. Shear Capacity (kips)**	**Tension Connect. Bearing Capacity (kips)**	**Tension Connect. Rupture Capacity (kips)**	**Length Tens. Member (ft)**	**No. Of Bolts Tens.**	**No. Of Holes**	**Hole Diameter (in)**
Leg1	Leg1	SAU	2.5X2X0.1875	33.0	14.86	Comp	1.46	Leg1Y	0.239	NESC Ext	17.444	18.200	21.094	16.406	5.385	2	1.000	0.6875
Leg2	Leg2	SAE	4X4X0.3125	33.0	96.10	Tens	96.10	Leg6Y	59.146	NESC Ext	61.546	109.200	105.469	93.750	4.250	6	2.490	0.6875
Leg3	Leg3	SAE	4X4X0.4375	33.0	96.12	Comp	85.99	Leg8Y	71.734	NESC Ext	83.423	0.000	0.000	0.000	6.152	0	2.600	0.6875
Leg4	Leg4	SAE	5X5X0.375	33.0	96.54	Comp	74.08	Leg13Y	53.932	NESC Ext	98.030	72.800	168.750	187.500	17.942	8	2.480	0.6875
XBrace1	XBrace1	SAE	1.75X1.75X0.1875	33.0	55.44	Tens	55.44	XBrace2X	7.124	NESC Ext	14.585	18.200	21.094	12.850	5.315	2	1.000	0.6875
XBrace2	XBrace2	SAU	3X2X0.25	33.0	44.57	Tens	44.57	XBrace8X	7.926	NESC Ext	17.783	27.300	42.187	32.812	5.836	3	3.440	0.6875
XBrace3	XBrace3	SAE	2.5X2.5X0.25	33.0	65.18	Comp	62.58	XBrace13X	11.390	NESC Ext	30.238	18.200	28.125	21.875	5.836	2	1.000	0.6875
XBrace4	XBrace4	SAE	2X2X0.25	33.0	54.78	Comp	42.93	XBrace14XY	7.813	NESC Ext	22.813	18.200	28.125	21.875	7.844	2	1.000	0.6875
XBrace5	XBrace5	SAE	2X2X0.1875	33.0	62.79	Cross	36.41	XBrace18Y	2.784	NESC Ext	17.258	9.100	10.547	7.646	11.183	1	1.000	0.6875
XBrace6	XBrace6	SAE	2.5X2.5X0.1875	33.0	23.73	Tens	23.73	XBrace21Y	1.946	NESC Ext	22.961	9.100	10.547	8.203	12.709	1	1.000	0.6875
XBrace7	XBrace7	SAE	3X3X0.25	33.0	19.27	Comp	13.45	XBrace22Y	1.224	NESC Ext	37.663	9.100	14.062	10.937	15.168	1	1.000	0.6875
XBrace8	XBrace8	SAU	2X1.5X0.1875	33.0	39.51	Tens	39.51	XBrace24P	5.763	NESC Ext	14.585	18.200	21.094	16.406	24.697	2	1.000	0.6875
Horz1	Horizontal 1	SAE	2X2X0.1875	33.0	59.13	Tens	59.13	Horz1P	4.521	NESC Ext	17.258	9.100	10.547	7.646	4.000	1	1.000	0.6875
Horz2	Horizontal 2	SAU	3X2.5X0.25	33.0	47.17	Comp	0.90	Horz7P	0.082	NESC Ext	30.090	9.100	14.062	9.164	14.400	1	1.000	0.6875
Diag1	Diagonal 1	SAU	3.5X2.5X0.25	33.0	8.61	Comp	0.00	Diagonal 1Y	0.000		34.856	27.300	42.187	32.812	13.153	3	1.550	0.6875
Diag2	Diagonal 2	Bar	2x3/16	33.0	71.53	Tens	71.53	Diagonal 5P	5.228	NESC Hea	7.309	9.100	10.547	8.490	10.589	1	1.000	0.6875

Diag3	Diagonal 3	Bar	2x1/4	33.0	31.12	Tens	31.12	Diagonal 6P	2.832	NESC Hea	9.745	9.100	14.062	11.320	4.000	1	1.000	0.6875	
Arm1	Arm1	DAL	2.5X2X0.1875	33.0	70.01	Tens	70.01	Arm2P	6.371	NESC Hea	27.231	9.100	21.094	17.121	4.000	1	4.000	0.6875	
Arm2	Arm2	SAE	2.5X2.5X0.25	33.0	24.71	Comp	0.81	Arm8P	0.148	NESC Ext	30.238	18.200	28.125	40.441	4.000	2	1.000	0.6875	
Arm3	**Arm3**	**SAU**	**3.5X2.5X0.25**	**33.0**	**30.89**	**Comp**	**0.00**	**Arm6Y**	**0.000**		**34.345**	**18.200**	**28.125**	**25.735**	**4.000**	**2**	**1.650**	**0.6875**	**A potentially damaging moment exists in the following members (make sure your system is well triangulated to minimize moments): Arm5P Arm5X Arm5XY Arm5Y ??**
Inner1	Inner1	SAE	1.75X1.75X0.1875	33.0	8.15	Tens	8.15	g63X	0.497	NESC Ext	14.585	9.100	10.547	6.100	5.657	1	1.000	0.6875	
Inner2	Inner1	SAU	2X1.5X0.1875	33.0	35.29	Comp	4.98	g64X	0.381	NESC Ext	14.585	9.100	10.547	7.646	20.365	1	1.000	0.6875	
XBrace1R	XBrace1R	SAE	2X2X0.3125	36.0	47.17	Comp	46.21	XBrace6X	8.410	NESC Ext	30.299	18.200	33.984	20.543	5.315	2	1.000	0.6875	
Horz3	Horizontal 3	SAE	2X2X0.25	33.0	89.45	Tens	89.45	Horz3P	8.140	NESC Ext	22.813	9.100	14.062	10.195	4.000	1	1.000	0.6875	

*** Maximum Stress Summary for Each Load Case

Summary of Maximum Usages by Load Case:

Load Case	Maximum Usage %	Element Label	Element Type
NESC Heavy	71.53	Diagonal 5P	Angle
NESC Extreme	96.54	Leg13X	Angle

Summary of Insulator Usages:

Insulator Label	Insulator Type	Maximum Usage %	Load Case	Weight (lbs)
Clamp1	Clamp	3.09	NESC Heavy	0.0
Clamp2	Clamp	3.03	NESC Heavy	0.0
Clamp3	Clamp	4.29	NESC Heavy	0.0
Clamp4	Clamp	4.27	NESC Heavy	0.0
Clamp5	Clamp	4.39	NESC Heavy	0.0
Clamp6	Clamp	4.37	NESC Heavy	0.0
Clamp7	Clamp	4.32	NESC Heavy	0.0
Clamp8	Clamp	4.29	NESC Heavy	0.0
Clamp9	Clamp	15.85	NESC Extreme	0.0
Clamp10	Clamp	1.45	NESC Extreme	0.0
Clamp11	Clamp	1.57	NESC Extreme	0.0
Clamp12	Clamp	2.07	NESC Extreme	0.0
Clamp13	Clamp	2.20	NESC Extreme	0.0
Clamp14	Clamp	2.81	NESC Extreme	0.0
Clamp15	Clamp	4.91	NESC Heavy	0.0
Clamp16	Clamp	19.60	NESC Extreme	0.0
Clamp17	Clamp	1.45	NESC Extreme	0.0
Clamp18	Clamp	1.57	NESC Extreme	0.0
Clamp19	Clamp	2.07	NESC Extreme	0.0
Clamp20	Clamp	2.20	NESC Extreme	0.0
Clamp21	Clamp	2.81	NESC Extreme	0.0

Clamp22	Clamp	4.67	NESC Heavy	0.0
Clamp23	Clamp	12.63	NESC Extreme	0.0
Clamp24	Clamp	17.21	NESC Extreme	0.0
Clamp25	Clamp	14.98	NESC Extreme	0.0
Clamp26	Clamp	18.23	NESC Extreme	0.0
Clamp27	Clamp	12.61	NESC Extreme	0.0
Clamp28	Clamp	8.31	NESC Heavy	0.0
Clamp29	Clamp	0.26	NESC Heavy	0.0
Clamp30	Clamp	0.36	NESC Heavy	0.0
Clamp31	Clamp	0.91	NESC Extreme	0.0
Clamp32	Clamp	0.66	NESC Extreme	0.0
Clamp33	Clamp	0.66	NESC Extreme	0.0
Clamp34	Clamp	1.37	NESC Heavy	0.0
Clamp35	Clamp	0.25	NESC Extreme	0.0
Clamp36	Clamp	0.29	NESC Heavy	0.0
Clamp37	Clamp	0.91	NESC Extreme	0.0
Clamp38	Clamp	0.66	NESC Extreme	0.0
Clamp39	Clamp	0.66	NESC Extreme	0.0
Clamp40	Clamp	1.16	NESC Heavy	0.0
Clamp43	Clamp	0.25	NESC Extreme	0.0
Clamp44	Clamp	0.25	NESC Extreme	0.0

Loads At Insulator Attachments For All Load Cases:

Load Case	Insulator Label	Insulator Type	Structure Attach Label	Structure Attach Load X (kips)	Structure Attach Load Y (kips)	Structure Attach Load Z (kips)	Structure Attach Load Res. (kips)
NESC Heavy	Clamp1	Clamp	15P	0.000	0.852	1.286	1.543
NESC Heavy	Clamp2	Clamp	15X	0.000	0.799	1.287	1.515
NESC Heavy	Clamp3	Clamp	16P	0.000	0.933	1.933	2.146
NESC Heavy	Clamp4	Clamp	16X	0.000	0.906	1.934	2.135
NESC Heavy	Clamp5	Clamp	17P	0.000	0.940	1.985	2.196
NESC Heavy	Clamp6	Clamp	17X	0.000	0.906	1.986	2.183
NESC Heavy	Clamp7	Clamp	18P	0.000	0.946	1.942	2.160
NESC Heavy	Clamp8	Clamp	18X	0.000	0.906	1.943	2.144
NESC Heavy	Clamp9	Clamp	2P	-1.062	1.560	1.565	2.451
NESC Heavy	Clamp10	Clamp	4S	0.000	0.238	0.628	0.671
NESC Heavy	Clamp11	Clamp	6S	0.000	0.312	0.705	0.771
NESC Heavy	Clamp12	Clamp	8P	0.000	0.291	0.694	0.753
NESC Heavy	Clamp13	Clamp	10S	0.000	0.355	0.857	0.927
NESC Heavy	Clamp14	Clamp	12S	0.000	0.477	1.134	1.230
NESC Heavy	Clamp15	Clamp	14S	0.000	0.971	2.255	2.455
NESC Heavy	Clamp16	Clamp	2X	1.085	1.486	4.976	5.305
NESC Heavy	Clamp17	Clamp	4X	0.000	0.185	0.628	0.654
NESC Heavy	Clamp18	Clamp	6X	0.000	0.204	0.705	0.734
NESC Heavy	Clamp19	Clamp	8X	0.000	0.182	0.694	0.718
NESC Heavy	Clamp20	Clamp	10X	0.000	0.238	0.857	0.889
NESC Heavy	Clamp21	Clamp	12X	0.000	0.332	1.134	1.182
NESC Heavy	Clamp22	Clamp	14X	0.000	0.609	2.255	2.336
NESC Heavy	Clamp23	Clamp	5S	0.308	-0.231	0.403	0.557
NESC Heavy	Clamp24	Clamp	5X	-0.333	-0.374	4.501	4.528
NESC Heavy	Clamp25	Clamp	2Y	1.089	1.215	0.600	1.738
NESC Heavy	Clamp26	Clamp	2XY	-1.112	1.139	4.002	4.307
NESC Heavy	Clamp27	Clamp	5Y	-0.310	-0.224	0.099	0.395
NESC Heavy	Clamp28	Clamp	5XY	0.335	-0.362	4.124	4.153
NESC Heavy	Clamp29	Clamp	4Y	0.000	0.053	0.119	0.130
NESC Heavy	Clamp30	Clamp	6Y	0.000	0.108	0.145	0.181

NESC Heavy	Clamp31	Clamp	8Y	0.000	0.109	0.194	0.223
NESC Heavy	Clamp32	Clamp	10Y	0.000	0.117	0.202	0.233
NESC Heavy	Clamp33	Clamp	12Y	0.000	0.145	0.220	0.263
NESC Heavy	Clamp34	Clamp	14Y	0.000	0.362	0.582	0.686
NESC Heavy	Clamp35	Clamp	4XY	0.000	0.000	0.119	0.119
NESC Heavy	Clamp36	Clamp	6XY	0.000	0.000	0.145	0.145
NESC Heavy	Clamp37	Clamp	8XY	0.000	0.000	0.194	0.194
NESC Heavy	Clamp38	Clamp	10XY	0.000	0.000	0.202	0.202
NESC Heavy	Clamp39	Clamp	12XY	0.000	0.000	0.220	0.220
NESC Heavy	Clamp40	Clamp	14XY	0.000	0.000	0.582	0.582
NESC Heavy	Clamp43	Clamp	3XY	0.000	0.000	0.096	0.096
NESC Heavy	Clamp44	Clamp	3Y	0.000	0.066	0.096	0.116
NESC Extreme	Clamp1	Clamp	15P	0.006	0.665	0.332	0.744
NESC Extreme	Clamp2	Clamp	15X	0.000	0.670	0.332	0.748
NESC Extreme	Clamp3	Clamp	16P	0.035	0.963	0.715	1.200
NESC Extreme	Clamp4	Clamp	16X	0.000	0.969	0.715	1.204
NESC Extreme	Clamp5	Clamp	17P	0.035	0.963	0.715	1.200
NESC Extreme	Clamp6	Clamp	17X	0.000	0.969	0.715	1.204
NESC Extreme	Clamp7	Clamp	18P	0.035	0.963	0.715	1.200
NESC Extreme	Clamp8	Clamp	18X	0.000	0.969	0.715	1.204
NESC Extreme	Clamp9	Clamp	2P	-3.729	5.184	-4.692	7.924
NESC Extreme	Clamp10	Clamp	4S	0.000	0.688	0.221	0.723
NESC Extreme	Clamp11	Clamp	6S	0.000	0.749	0.235	0.785
NESC Extreme	Clamp12	Clamp	8P	0.000	0.954	0.398	1.034
NESC Extreme	Clamp13	Clamp	10S	0.000	1.039	0.356	1.098
NESC Extreme	Clamp14	Clamp	12S	0.000	1.340	0.426	1.406
NESC Extreme	Clamp15	Clamp	14S	0.000	2.223	0.632	2.311
NESC Extreme	Clamp16	Clamp	2X	3.732	5.092	7.493	9.798
NESC Extreme	Clamp17	Clamp	4X	0.000	0.688	0.221	0.723
NESC Extreme	Clamp18	Clamp	6X	0.000	0.749	0.235	0.785
NESC Extreme	Clamp19	Clamp	8X	0.000	0.954	0.398	1.034
NESC Extreme	Clamp20	Clamp	10X	0.000	1.039	0.356	1.098
NESC Extreme	Clamp21	Clamp	12X	0.000	1.340	0.426	1.406
NESC Extreme	Clamp22	Clamp	14X	0.000	2.223	0.632	2.311
NESC Extreme	Clamp23	Clamp	5S	1.150	-1.090	-6.113	6.315
NESC Extreme	Clamp24	Clamp	5X	-1.159	-1.196	8.442	8.605
NESC Extreme	Clamp25	Clamp	2Y	3.802	4.149	-4.942	7.489
NESC Extreme	Clamp26	Clamp	2XY	-3.805	4.057	7.222	9.116
NESC Extreme	Clamp27	Clamp	5Y	-1.155	-1.065	-6.108	6.306
NESC Extreme	Clamp28	Clamp	5XY	1.165	-1.170	0.900	1.881
NESC Extreme	Clamp29	Clamp	4Y	0.000	0.096	0.083	0.127
NESC Extreme	Clamp30	Clamp	6Y	0.000	0.096	0.083	0.127
NESC Extreme	Clamp31	Clamp	8Y	0.000	0.372	0.262	0.455
NESC Extreme	Clamp32	Clamp	10Y	0.000	0.276	0.178	0.329
NESC Extreme	Clamp33	Clamp	12Y	0.000	0.276	0.178	0.329
NESC Extreme	Clamp34	Clamp	14Y	0.000	0.276	0.178	0.329
NESC Extreme	Clamp35	Clamp	4XY	0.000	0.096	0.083	0.127
NESC Extreme	Clamp36	Clamp	6XY	0.000	0.096	0.083	0.127
NESC Extreme	Clamp37	Clamp	8XY	0.000	0.372	0.262	0.455
NESC Extreme	Clamp38	Clamp	10XY	0.000	0.276	0.178	0.329
NESC Extreme	Clamp39	Clamp	12XY	0.000	0.276	0.178	0.329
NESC Extreme	Clamp40	Clamp	14XY	0.000	0.276	0.178	0.329
NESC Extreme	Clamp43	Clamp	3XY	0.000	0.096	0.083	0.127
NESC Extreme	Clamp44	Clamp	3Y	0.000	0.096	0.083	0.127

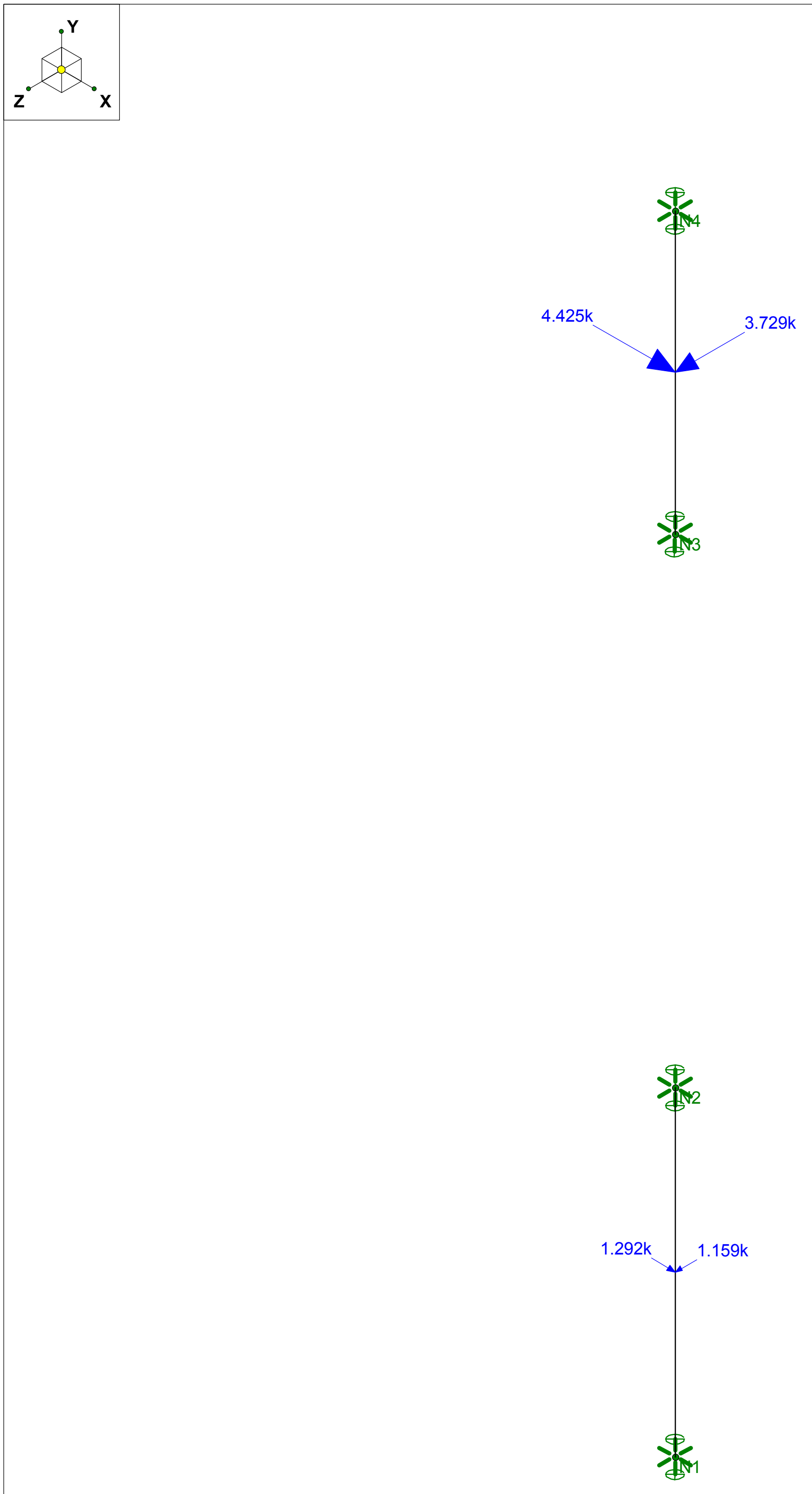
Overturning Moments For User Input Concentrated Loads:

Moments are static equivalents based on central axis of 0,0 (i.e. a single pole).

Load Case	Total Tran. Load (kips)	Total Long. Load (kips)	Total Vert. Load (kips)	Transverse Overturning Moment (ft-k)	Longitudinal Overturning Moment (ft-k)	Torsional Moment (ft-k)
NESC Heavy	14.460	-0.000	41.886	930.827	48.698	17.255
NESC Extreme	30.758	0.112	8.440	1944.487	35.102	56.169

*** Weight of structure (lbs):
Weight of Angles*Section DLF: 8490.0
Total: 8490.0

*** End of Report

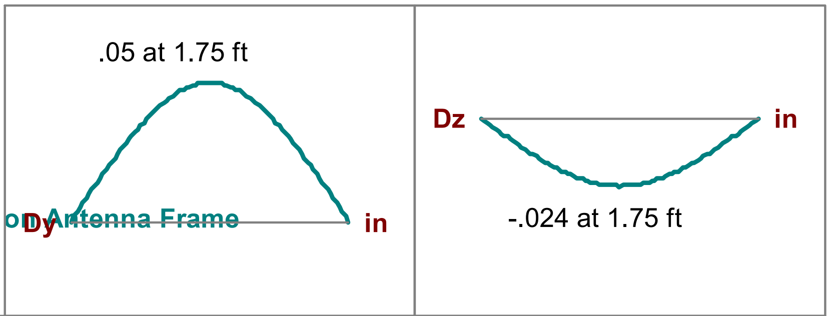


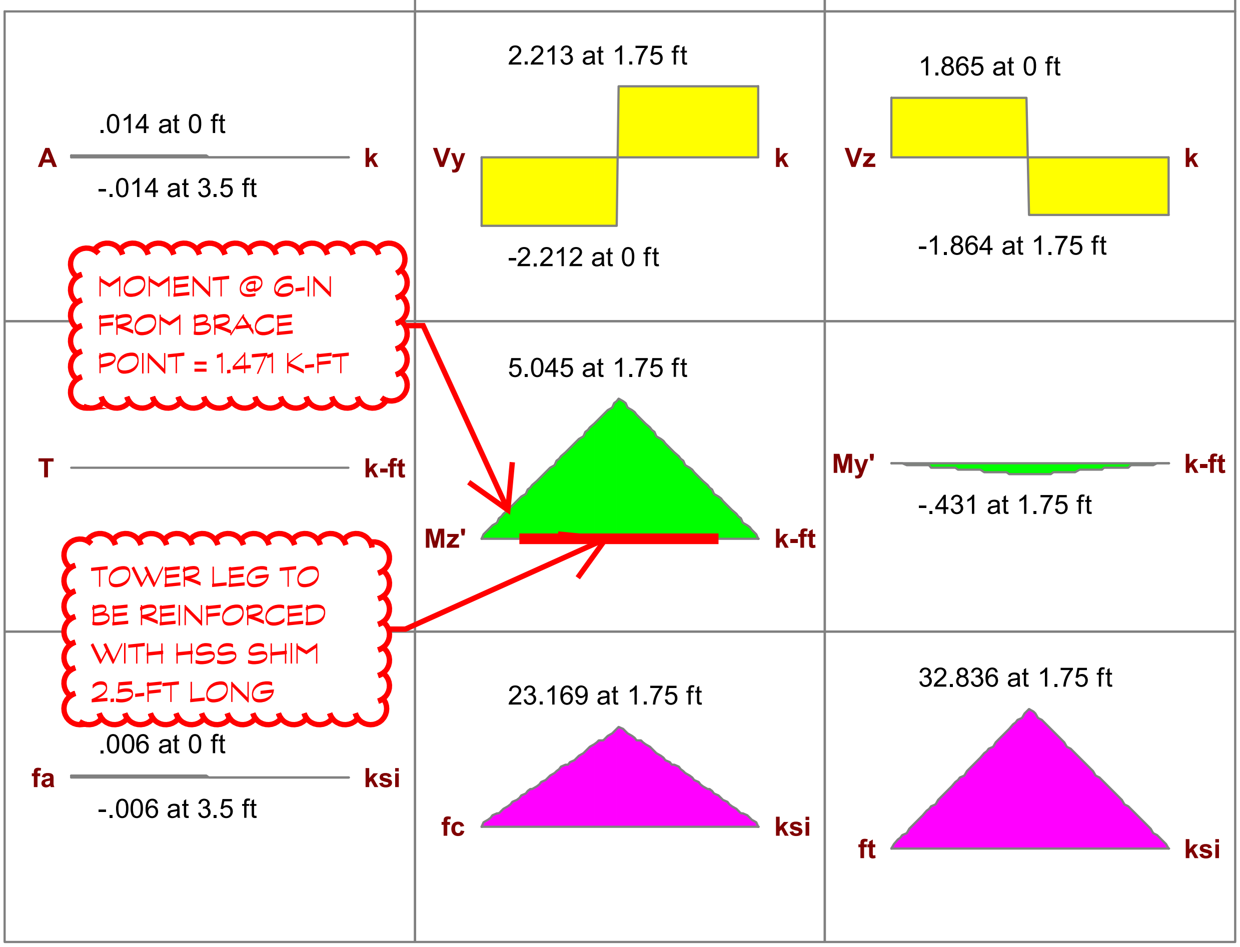
Loads: LC 2, x-dir NESC Extreme Wind on Antenna Frame
Results for LC 2, x-dir NESC Extreme Wind on Antenna Frame

CENTEK Engineering, Inc.	CL&P # 783 - Mast	
tjl, cfc		Oct 6, 2014 at 10:23 AM
13305 / AT&T CT2117		Moment Diagram.r3d

Beam: ***M2***

Shape: **L4x4x5**
Material: **A36 Gr.36**
Length: **3.5 ft**
I Joint: **N3**
J Joint: **N4**
LC 2: x-dir NESC Extreme Wind on Antenna Frame
Code Check: **0.147 (shear)**
Report Based On 97 Sections





AISC 9th: ASD Code Check

-- Code Check based on Axial Only --

Max Bending Check	**0.000**	Max Shear Check	**0.147 (y)**
Location	**0 ft**	Location	**1.75 ft**
Equation	**H1-1**	Max Defl Ratio	**L/804**

Slender (Qs= 0.996704 , Qa= 1)

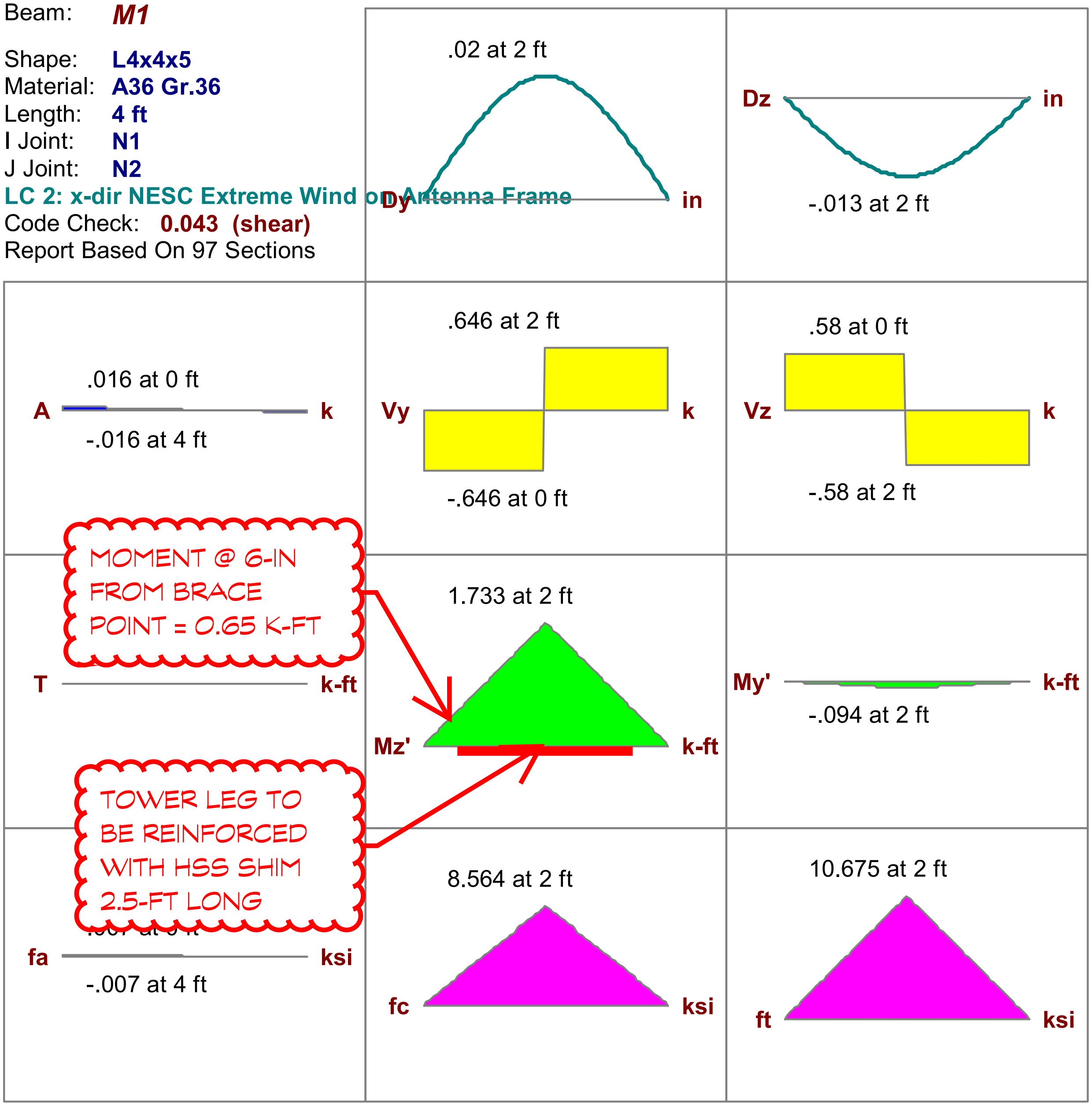
Fy	**36 ksi**
Fa	**17.961 ksi**
Ft	**21.6 ksi**
Fby	**NA**
Fbz	**NA**
Fvy	**14.4 ksi**
Fvz	**14.4 ksi**
Cb	**1**

	y-y'	z-z'
Cm	**.85**	**.85**
Lb	**3.5 ft**	**3.5 ft**
KL/r	**53.777**	**26.842**
Sway	**No**	**No**

L Comp Flange **3.5 ft**
Warp Length **NC**

Beam: ***M1***

Shape: **L4x4x5**
Material: **A36 Gr.36**
Length: **4 ft**
I Joint: **N1**
J Joint: **N2**
LC 2: x-dir NESC Extreme Wind on Antenna Frame
Code Check: **0.043 (shear)**
Report Based On 97 Sections



AISC 9th: ASD Code Check

-- Code Check based on Axial Only --

Max Bending Check	**0.000**	Max Shear Check	**0.043 (y)**
Location	**0 ft**	Location	**0 ft**
Equation	**H1-1**	Max Defl Ratio	**L/2048**

Slender (Qs= 0.996704 , Qa= 1)

Fy	**36 ksi**		y-y'	z-z'
Fa	**17.241 ksi**	Cm	**.85**	**.85**
Ft	**21.6 ksi**	Lb	**4 ft**	**4 ft**
Fby	**NA**	KL/r	**61.46**	**30.676**
Fbz	**NA**	Sway	**No**	**No**
Fvy	**14.4 ksi**			
Fvz	**14.4 ksi**			
Cb	**1**			

L Comp Flange **4 ft**
Warp Length **NC**

Antenna Mast Top Connection:

Maximum Design Reactions at Brace:

Compression Force =	$Compression := 13.3 \cdot kips$	(User Input from PLS-Tower)
Tension Force =	$Tension := 10.5 \cdot kips$	(User Input from PLS-Tower)
Moment =	$M_x := 1.471 \cdot ft \cdot kips$	(User Input - Moment @ 6-in from brace point)
Moment =	$M_y := 0.126 \cdot ft \cdot kips$	(User Input - Moment @ 6-in from brace point)

Member Properties:

Member Type =	L4x4x5/16	
Member Width =	$w := 4 \cdot in$	(User Input)
Member Thickness =	$t := 0.3125 \cdot in$	(User Input)
Member Area =	$A := 2.4 \cdot in^2$	(User Input)
Moment of Inertia =	$I_x := 3.67 \cdot in^4$	(User Input)
Moment of Inertia =	$I_y := 3.67 \cdot in^4$	(User Input)
Section Modulus x-dir =	$S_x := 1.27 \cdot in^3$	(User Input)
Section Modulus y-dir =	$S_y := 1.27 \cdot in^3$	(User Input)
Unbraced Length =	$L := 3.5 \cdot ft$	(User Input)
Effective Length Coefficient =	$K := 1$	(User Input)
Radius of Gyration =	$r_x := 1.24 \cdot in$	(User Input)
Radius of Gyration =	$r_y := 1.24 \cdot in$	(User Input)
Yield Stress =	$F_y := 33 \cdot ksi$	(User Input)
Modulus of Elasticity =	$E := 29000 \cdot ksi$	(User Input)

Calculate Design Compression Stress: (Per ASCE 10-97 Section 3.6 and 3.7)

Width Thickness Ratio = $w\_t := \frac{w - k_{des}}{t} = 10.8$

Yield Stress = $F_y := \begin{cases} F_y & \text{if } w\_t < \frac{80}{\sqrt{f_y}} \\ \left[1.677 - 0.677 \cdot \frac{w\_t}{\left(\frac{80}{\sqrt{f_y}}\right)}\right] \cdot F_y & \text{if } \frac{80}{\sqrt{f_y}} \le w\_t \le \frac{144}{\sqrt{f_y}} \\ \frac{0.0332 \cdot \pi^2 \cdot E}{(w\_t)^2} & \text{if } w\_t > \frac{144}{\sqrt{f_y}} \end{cases} = 33 \cdot ksi$ (3.7-1) (3.7-2) (3.7-3)

Column Slenderness Ratio = $C_c := \pi \cdot \sqrt{\frac{2 \cdot E}{F_y}} = 131.706$ (3.6-3)

Design Axial Compressive Stress = $F_a := \begin{cases} \left[1 - 0.5\left(\frac{\frac{K \cdot L}{r_x}}{C_c}\right)^2\right] \cdot F_y & \text{if } \frac{K \cdot L}{r_x} \le C_c \\ \frac{\pi^2 \cdot E}{\left(\frac{K \cdot L}{r_x}\right)^2} & \text{if } \frac{K \cdot L}{r_x} > C_c \end{cases} = 31.9 \cdot ksi$ (3.6-1) (3.6-2)

Calculate Allowable Bending Moment: (Per ASCE 10-97 Section 3.14.8)

$b := w - \frac{t}{2} = 3.844 \cdot in$

Elastic Critical Moment = $M_e := \frac{\left(0.66 \cdot E \cdot b^4 \cdot t\right)}{(K \cdot L)^2} \cdot \left[\sqrt{1 + \frac{0.81 \cdot (K \cdot L)^2 \cdot t^2}{b^4}} + 1\right] = 1687.8 \cdot kips \cdot in$ (3.14-7)

Moment Causing Compressive Yield = $M_{xc} := F_y \cdot S_x = 41.91 \cdot in \cdot kips$ (3.14-9)

Moment Causing Compressive Yield = $M_{yc} := F_y \cdot S_y = 41.91 \cdot kips \cdot in$ (3.14-9)

Lateral Bukling Moment = $M_b := \begin{cases} M_e & \text{if } M_e \le 0.5 \cdot M_{yc} \\ M_{yc} \cdot \left(1 - \frac{M_{yc}}{4 \cdot M_e}\right) & \text{if } M_e > 0.5 \cdot M_{yc} \end{cases} = 41.6 \cdot kips \cdot in$ (3.14-5)

Allowable Moment = $M_a := \begin{pmatrix} M_{yc} & \text{if } M_{yc} \le M_b \\ M_b & \end{pmatrix} = 41.6 \cdot kips \cdot in$ (3.14-6)

Check Combined Axial Compression and Bending: (Per ASCE 10-97 Section 3.12)

Bending Coefficient = $C_m := 1$ (for restrained ends)

Applied Axial Compression = $P := \text{Compression} = 13.3 \cdot \text{kips}$

Design Axial Compression = $P_a := F_a \cdot A = 76.6 \cdot \text{kips}$

Axial Compression at Yield = $P_y := F_y \cdot A = 79.2 \cdot \text{kips}$

Euler Bukling Load = $P_{ex} := \dfrac{\pi^2 \cdot E \cdot I_x}{(K \cdot L)^2} = 595.5 \cdot \text{kips}$

Euler Bukling Load = $P_{ey} := \dfrac{\pi^2 \cdot E \cdot I_y}{(K \cdot L)^2} = 595.5 \cdot \text{kips}$

$$\text{Condition1} := \text{if}\left[\frac{P}{P_a} + \frac{C_m \cdot M_x}{M_{xc}} \cdot \left[\frac{1}{\left(1 - \frac{P}{P_{ex}}\right)}\right] + \frac{C_m \cdot M_y}{M_{yc}} \cdot \left[\frac{1}{\left(1 - \frac{P}{P_{ey}}\right)}\right] \le 1.00, \text{"OK"}, \text{"Overstressed"}\right] \quad (3.12\text{-}1)$$

$\text{Condition1} = \text{"OK"}$

$$\text{Condition2} := \text{if}\left(\frac{P}{P_y} + \frac{M_x}{M_{xc}} + \frac{M_y}{M_{yc}} \le 1.00, \text{"OK"}, \text{"Overstressed"}\right) \quad (3.12\text{-}2)$$

$\text{Condition2} = \text{"OK"}$

Antenna Mast Bottom Connection:

Maximum Design Reactions at Brace:

Compression Force =	$Compression := 52.8 \cdot kips$	(User Input from PLS-Tower)
Tension Force =	$Tension := 47.6 \cdot kips$	(User Input from PLS-Tower)
Moment =	$M_x := 0.65 \cdot ft \cdot kips$	(User Input - Max Moment)
Moment =	$M_y := 0.035 \cdot ft \cdot kips$	(User Input - Max Moment)

Member Properties:

Member Type =	L4x4x5/16	
Member Width =	$w := 4 \cdot in$	(User Input)
Member Thickness =	$t := 0.3125 \cdot in$	(User Input)
Member Area =	$A := 2.4 \cdot in^2$	(User Input)
Moment of Inertia =	$I_x := 3.67 \cdot in^4$	(User Input)
Moment of Inertia =	$I_y := 3.67 \cdot in^4$	(User Input)
Section Modulus x-dir =	$S_x := 1.27 \cdot in^3$	(User Input)
Section Modulus y-dir =	$S_y := 1.27 \cdot in^3$	(User Input)
Unbraced Length =	$L := 4 \cdot ft$	(User Input)
Effective Length Coefficient =	$K := 1$	(User Input)
Radius of Gyration =	$r_x := 1.24 \cdot in$	(User Input)
Radius of Gyration =	$r_y := 1.24 \cdot in$	(User Input)
Yield Stress =	$F_y := 33 \cdot ksi$	(User Input)
Modulus of Elasticity =	$E := 29000 \cdot ksi$	(User Input)

Calculate Design Compression Stress: (Per ASCE 10-97 Section 3.6 and 3.7)

Width Thickness Ratio = $w\_t := \frac{w - k_{des}}{t} = 6.976$

Yield Stress =

$$F_y := \begin{cases} F_y & \text{if } w\_t < \frac{80}{\sqrt{f_y}} \quad (3.7\text{-}1) \\ \left[1.677 - 0.677 \cdot \frac{w\_t}{\left(\frac{80}{\sqrt{f_y}}\right)}\right] \cdot F_y & \text{if } \frac{80}{\sqrt{f_y}} \le w\_t \le \frac{144}{\sqrt{f_y}} \quad (3.7\text{-}2) \\ \frac{0.0332 \cdot \pi^2 \cdot E}{(w\_t)^2} & \text{if } w\_t > \frac{144}{\sqrt{f_y}} \quad (3.7\text{-}3) \end{cases} = 33 \cdot ksi$$

Column Slenderness Ratio = $C_c := \pi \cdot \sqrt{\frac{2 \cdot E}{F_y}} = 131.706$ (3.6-3)

Design Axial Compressive Stress =

$$F_a := \begin{cases} \left[1 - 0.5\left(\frac{\frac{K \cdot L}{r_x}}{C_c}\right)^2\right] \cdot F_y & \text{if } \frac{K \cdot L}{r_x} \le C_c \quad (3.6\text{-}1) \\ \frac{\pi^2 \cdot E}{\left(\frac{K \cdot L}{r_x}\right)^2} & \text{if } \frac{K \cdot L}{r_x} > C_c \quad (3.6\text{-}2) \end{cases} = 31.6 \cdot ksi$$

Calculate Allowable Bending Moment: (Per ASCE 10-97 Section 3.14.8)

$$b := w - \frac{t}{2} = 3.844 \cdot in$$

Elastic Critical Moment = $M_e := \frac{\left(0.66 \cdot E \cdot b^4 \cdot t\right)}{(K \cdot L)^2} \cdot \left[\sqrt{1 + \frac{0.81 \cdot (K \cdot L)^2 \cdot t^2}{b^4}} + 1\right] = 1334.3 \cdot kips \cdot in$ (3.14-7)

Moment Causing Compressive Yield = $M_{xc} := F_y \cdot S_x = 41.91 \cdot in \cdot kips$ (3.14-9)

Moment Causing Compressive Yield = $M_{yc} := F_y \cdot S_y = 41.91 \cdot kips \cdot in$ (3.14-9)

Lateral Bukling Moment =

$$M_b := \begin{cases} M_e & \text{if } M_e \le 0.5 \cdot M_{yc} \\ M_{yc} \cdot \left(1 - \frac{M_{yc}}{4 \cdot M_e}\right) & \text{if } M_e > 0.5 \cdot M_{yc} \end{cases} = 41.6 \cdot kips \cdot in \quad (3.14\text{-}5)$$

Allowable Moment =

$$M_a := \begin{cases} M_{yc} & \text{if } M_{yc} \le M_b \\ M_b \end{cases} = 41.6 \cdot kips \cdot in \quad (3.14\text{-}6)$$

Check Combined Axial Compression and Bending: (Per ASCE 10-97 Section 3.12)

Bending Coefficient = $C_m := 1$ (for restrained ends)

Applied Axial Compression = $P := \text{Compression} = 52.8 \cdot \text{kips}$

Design Axial Compression = $P_a := F_a \cdot A = 75.8 \cdot \text{kips}$

Axial Compression at Yield = $P_y := F_y \cdot A = 79.2 \cdot \text{kips}$

Euler Bukling Load = $P_{ex} := \dfrac{\pi^2 \cdot E \cdot I_x}{(K \cdot L)^2} = 455.9 \cdot \text{kips}$

Euler Bukling Load = $P_{ey} := \dfrac{\pi^2 \cdot E \cdot I_y}{(K \cdot L)^2} = 455.9 \cdot \text{kips}$

$$\text{Condition1} := \text{if}\left[\frac{P}{P_a} + \frac{C_m \cdot M_x}{M_{xc}} \cdot \left[\frac{1}{\left(1 - \frac{P}{P_{ex}}\right)}\right] + \frac{C_m \cdot M_y}{M_{yc}} \cdot \left[\frac{1}{\left(1 - \frac{P}{P_{ey}}\right)}\right] \le 1.00, \text{"OK"}, \text{"Overstressed"}\right] \quad (3.12\text{-}1)$$

Condition1 = "OK"

$$\text{Condition2} := \text{if}\left(\frac{P}{P_y} + \frac{M_x}{M_{xc}} + \frac{M_y}{M_{yc}} \le 1.00, \text{"OK"}, \text{"Overstressed"}\right) \quad (3.12\text{-}2)$$

Condition2 = "OK"

Section Properties: Section1

Section Information:

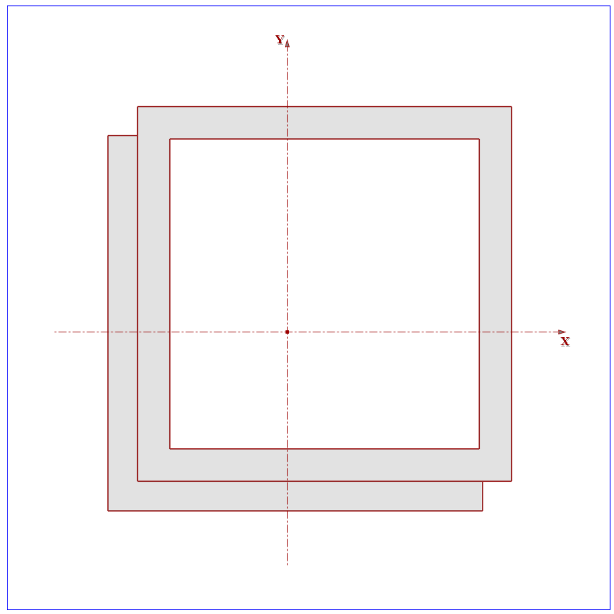
Material Type	=	General	
Shape Type	=	Arbitrary	
Number of Shapes	=	2	

Basic Properties:

Total Width	=	4.313	in
Total Height	=	4.313	in
Centroid, Xo	=	-0.400	in
Centroid, Yo	=	-0.400	in
X-Bar (Right)	=	2.400	in
X-Bar (Left)	=	1.912	in
Y-Bar (Top)	=	2.400	in
Y-Bar (Bot)	=	1.912	in
Max Thick	=	0.349	in

Equivalent Properties:

Area, Ax	=	7.180	in^2
Inertia, Ixx	=	16.259	in^4
Inertia, Iyy	=	16.259	in^4
Inertia, Ixy	=	0.078	in^4
Sx (Top)	=	6.774	in^3
Sx (Bot)	=	8.502	in^3
Sy (Left)	=	8.502	in^3
Sy (Right)	=	6.774	in^3
rx	=	1.505	in
ry	=	1.505	in
Plastic Zx	=	10.127	in^3
Plastic Zy	=	10.453	in^3
Torsional J	=	17.583	in^4
As-xx Def	=	1.000	
As-yy Def	=	1.000	
As-xx Stress	=	1.000	
As-yy Stress	=	1.000	



Section Diagram

Antenna Mast Top Connection:

Maximum Design Reactions at Brace:

Compression Force =	Compression := 13.4·kips	(User Input from PLS-Tower)
Tension Force =	Tension := 10.5·kips	(User Input from PLS-Tower)
Moment =	M_x := 5.045·ft·kips	(User Input - Max Moment)
Moment =	M_y := 0.431·ft·kips	(User Input - Max Moment)

Member Properties:

Member Type =	L4x4x5/16 w/ HSS4x4x3/8	
Member Width =	w := 4.32·in	(User Input)
Member Thickness =	t := 0.35·in	(User Input)
Member Area =	A := 7.18·in^2	(User Input)
Moment of Inertia =	I_x := 16.26·in^4	(User Input)
Moment of Inertia =	I_y := 16.26·in^4	(User Input)
Section Modulus x-dir =	S_x := 6.78·in^3	(User Input)
Section Modulus y-dir =	S_y := 6.78·in^3	(User Input)
Unbraced Length =	L := 3.5·ft	(User Input)
Effective Length Coefficient =	K := 1	(User Input)
Radius of Gyration =	r_x := 1.51·in	(User Input)
Radius of Gyration =	r_y := 1.51·in	(User Input)
Yield Stress =	F_y := 33·ksi	(User Input)
Modulus of Elasticity =	E := 29000·ksi	(User Input)

<u>Calculate Design Compression Stress:</u> (Per ASCE 10-97 Section 3.6 and 3.7)

Width Thickness Ratio = $w\_t := \dfrac{w - k_{des}}{t} = 10.557$

Yield Stress =

$$F_y := \begin{cases} F_y & \text{if } w\_t < \dfrac{80}{\sqrt{f_y}} & (3.7\text{-}1) \\ \left[1.677 - 0.677 \cdot \dfrac{w\_t}{\left(\dfrac{80}{\sqrt{f_y}}\right)}\right] \cdot F_y & \text{if } \dfrac{80}{\sqrt{f_y}} \le w\_t \le \dfrac{144}{\sqrt{f_y}} & (3.7\text{-}2) \\ \dfrac{0.0332 \cdot \pi^2 \cdot E}{(w\_t)^2} & \text{if } w\_t > \dfrac{144}{\sqrt{f_y}} & (3.7\text{-}3) \end{cases} = 33 \cdot ksi$$

Column Slenderness Ratio = $C_c := \pi \cdot \sqrt{\dfrac{2 \cdot E}{F_y}} = 131.706$ (3.6-3)

Design Axial Compressive Stress =

$$F_a := \begin{cases} \left[1 - 0.5\left(\dfrac{\dfrac{K \cdot L}{r_x}}{C_c}\right)^2\right] \cdot F_y & \text{if } \dfrac{K \cdot L}{r_x} \le C_c & (3.6\text{-}1) \\ \dfrac{\pi^2 \cdot E}{\left(\dfrac{K \cdot L}{r_x}\right)^2} & \text{if } \dfrac{K \cdot L}{r_x} > C_c & (3.6\text{-}2) \end{cases} = 32.3 \cdot ksi$$

<u>Calculate Allowable Bending Moment:</u> (Per ASCE 10-97 Section 3.14.8)

$b := w - \dfrac{t}{2} = 4.145 \cdot in$

Elastic Critical Moment = $M_e := \dfrac{\left(0.66 \cdot E \cdot b^4 \cdot t\right)}{(K \cdot L)^2} \cdot \left[\sqrt{1 + \dfrac{0.81 \cdot (K \cdot L)^2 \cdot t^2}{b^4}} + 1\right] = 2535.9 \cdot kips \cdot in$ (3.14-7)

Moment Causing Compressive Yield = $M_{xc} := F_y \cdot S_x = 223.74 \cdot in \cdot kips$ (3.14-9)

Moment Causing Compressive Yield = $M_{yc} := F_y \cdot S_y = 223.74 \cdot kips \cdot in$ (3.14-9)

Lateral Bukling Moment =

$$M_b := \begin{cases} M_e & \text{if } M_e \le 0.5 \cdot M_{yc} \\ M_{yc} \cdot \left(1 - \dfrac{M_{yc}}{4 \cdot M_e}\right) & \text{if } M_e > 0.5 \cdot M_{yc} \end{cases} = 218.8 \cdot kips \cdot in$$ (3.14-5)

Allowable Moment =

$$M_a := \begin{cases} M_{yc} & \text{if } M_{yc} \le M_b \\ M_b \end{cases} = 218.8 \cdot kips \cdot in$$ (3.14-6)

Check Combined Axial Compression and Bending: (Per ASCE 10-97 Section 3.12)

Bending Coefficient = $C_m := 1$ (for restrained ends)

Applied Axial Compression = $P := \text{Compression} = 13.4 \cdot \text{kips}$

Design Axial Compression = $P_a := F_a \cdot A = 231.7 \cdot \text{kips}$

Axial Compression at Yield = $P_y := F_y \cdot A = 236.94 \cdot \text{kips}$

Euler Bukling Load = $$P_{ex} := \frac{\pi^2 \cdot E \cdot I_x}{(K \cdot L)^2} = 2638.3 \cdot \text{kips}$$

Euler Bukling Load = $$P_{ey} := \frac{\pi^2 \cdot E \cdot I_y}{(K \cdot L)^2} = 2638.3 \cdot \text{kips}$$

$$\text{Condition1} := \text{if}\left[\frac{P}{P_a} + \frac{C_m \cdot M_x}{M_{xc}} \cdot \left[\frac{1}{\left(1 - \frac{P}{P_{ex}}\right)}\right] + \frac{C_m \cdot M_y}{M_{yc}} \cdot \left[\frac{1}{\left(1 - \frac{P}{P_{ey}}\right)}\right] \le 1.00, \text{"OK"}, \text{"Overstressed"}\right] \quad (3.12\text{-}1)$$

Condition1 = "OK"

$$\text{Condition2} := \text{if}\left(\frac{P}{P_y} + \frac{M_x}{M_{xc}} + \frac{M_y}{M_{yc}} \le 1.00, \text{"OK"}, \text{"Overstressed"}\right) \quad (3.12\text{-}2)$$

Condition2 = "OK"

Antenna Mast Bottom Connection:

Maximum Design Reactions at Brace:

Compression Force =	Compression := 52.8·kips	(User Input from PLS-Tower)
Tension Force =	Tension := 47.6·kips	(User Input from PLS-Tower)
Moment =	M_x := 1.733·ft·kips	(User Input - Max Moment)
Moment =	M_y := 0.094·ft·kips	(User Input - Max Moment)

Member Properties:

Member Type =	L4x4x5/16 w/ HSS4x4x3/8	
Member Width =	w := 4.32·in	(User Input)
Member Thickness =	t := 0.35·in	(User Input)
Member Area =	A := 7.18·in^2	(User Input)
Moment of Inertia =	I_x := 16.26·in^4	(User Input)
Moment of Inertia =	I_y := 16.26·in^4	(User Input)
Section Modulus x-dir =	S_x := 6.78·in^3	(User Input)
Section Modulus y-dir =	S_y := 6.78·in^3	(User Input)
Unbraced Length =	L := 4.0·ft	(User Input)
Effective Length Coefficient =	K := 1	(User Input)
Radius of Gyration =	r_x := 1.51·in	(User Input)
Radius of Gyration =	r_y := 1.51·in	(User Input)
Yield Stress =	F_y := 33·ksi	(User Input)
Modulus of Elasticity =	E := 29000·ksi	(User Input)

Calculate Design Compression Stress: (Per ASCE 10-97 Section 3.6 and 3.7)

Width Thickness Ratio = $w\_t := \frac{w - k_{des}}{t} = 10.557$

Yield Stress =
$$F_y := \begin{cases} F_y & \text{if } w\_t < \frac{80}{\sqrt{f_y}} \quad (3.7\text{-}1) \\ \left[1.677 - 0.677 \cdot \frac{w\_t}{\left(\frac{80}{\sqrt{f_y}}\right)}\right] \cdot F_y & \text{if } \frac{80}{\sqrt{f_y}} \le w\_t \le \frac{144}{\sqrt{f_y}} \quad (3.7\text{-}2) \\ \frac{0.0332 \cdot \pi^2 \cdot E}{(w\_t)^2} & \text{if } w\_t > \frac{144}{\sqrt{f_y}} \quad (3.7\text{-}3) \end{cases} = 33 \cdot \text{ksi}$$

Column Slenderness Ratio = $C_c := \pi \cdot \sqrt{\frac{2 \cdot E}{F_y}} = 131.706$ (3.6-3)

Design Axial Compressive Stress =
$$F_a := \begin{cases} \left[1 - 0.5\left(\frac{\frac{K \cdot L}{r_x}}{C_c}\right)^2\right] \cdot F_y & \text{if } \frac{K \cdot L}{r_x} \le C_c \quad (3.6\text{-}1) \\ \frac{\pi^2 \cdot E}{\left(\frac{K \cdot L}{r_x}\right)^2} & \text{if } \frac{K \cdot L}{r_x} > C_c \quad (3.6\text{-}2) \end{cases} = 32 \cdot \text{ksi}$$

Calculate Allowable Bending Moment: (Per ASCE 10-97 Section 3.14.8)

$b := w - \frac{t}{2} = 4.145 \cdot \text{in}$

Elastic Critical Moment = $M_e := \frac{(0.66 \cdot E \cdot b^4 \cdot t)}{(K \cdot L)^2} \cdot \left[\sqrt{1 + \frac{0.81 \cdot (K \cdot L)^2 \cdot t^2}{b^4}} + 1\right] = 2001.6 \cdot \text{kips} \cdot \text{in}$ (3.14-7)

Moment Causing Compressive Yield = $M_{xc} := F_y \cdot S_x = 223.74 \cdot \text{in} \cdot \text{kips}$ (3.14-9)

Moment Causing Compressive Yield = $M_{yc} := F_y \cdot S_y = 223.74 \cdot \text{kips} \cdot \text{in}$ (3.14-9)

Lateral Bukling Moment =
$$M_b := \begin{cases} M_e & \text{if } M_e \le 0.5 \cdot M_{yc} \\ M_{yc} \cdot \left(1 - \frac{M_{yc}}{4 \cdot M_e}\right) & \text{if } M_e > 0.5 \cdot M_{yc} \end{cases} = 217.5 \cdot \text{kips} \cdot \text{in}$$ (3.14-5)

Allowable Moment =
$$M_a := \begin{cases} M_{yc} & \text{if } M_{yc} \le M_b \\ M_b \end{cases} = 217.5 \cdot \text{kips} \cdot \text{in}$$ (3.14-6)

Check Combined Axial Compression and Bending: (Per ASCE 10-97 Section 3.12)

Bending Coefficient = $C_m := 1$ (for restrained ends)

Applied Axial Compression = $P := \text{Compression} = 52.8 \cdot \text{kips}$

Design Axial Compression = $P_a := F_a \cdot A = 230 \cdot \text{kips}$

Axial Compression at Yield = $P_y := F_y \cdot A = 236.94 \cdot \text{kips}$

Euler Bukling Load = $P_{ex} := \dfrac{\pi^2 \cdot E \cdot I_x}{(K \cdot L)^2} = 2019.9 \cdot \text{kips}$

Euler Bukling Load = $P_{ey} := \dfrac{\pi^2 \cdot E \cdot I_y}{(K \cdot L)^2} = 2019.9 \cdot \text{kips}$

$$\text{Condition1} := \text{if}\left[\frac{P}{P_a} + \frac{C_m \cdot M_x}{M_{xc}} \cdot \left[\frac{1}{\left(1 - \frac{P}{P_{ex}}\right)}\right] + \frac{C_m \cdot M_y}{M_{yc}} \cdot \left[\frac{1}{\left(1 - \frac{P}{P_{ey}}\right)}\right] \le 1.00, \text{"OK"}, \text{"Overstressed"}\right] \quad (3.12\text{-}1)$$

Condition1 = "OK"

$$\text{Condition2} := \text{if}\left(\frac{P}{P_y} + \frac{M_x}{M_{xc}} + \frac{M_y}{M_{yc}} \le 1.00, \text{"OK"}, \text{"Overstressed"}\right) \quad (3.12\text{-}2)$$

Condition2 = "OK"

Foundation Analysis

Input Data:

Max. Reactions at Tower Leg:

Shear =	$Shear := 60.66 \cdot 1.1 \cdot kips = 66.7 \cdot kips$	(User Input - Tot. Base Shear)
Compression =	$Comp := 130.05 \cdot 1.1 \cdot kips = 143.1 \cdot kips$	(User Input - Tot. Compression)
Uplift =	$Uplift := 113.12 \cdot 1.1 \cdot kips = 124.4 \cdot kips$	(User Input - Tot. Uplift)

Tower Properties:

Tower Height =	$H_t := 78 \cdot ft$	(User Input)
Distance to Uplift Legs =	$d_{uplift} := 24.5 \cdot ft$	(User Input)
Distance to Compression Legs =	$d_{comp} := 2.5 \cdot ft$	(User Input)

Foundation Properties:

Pier Height =	$P_H := 2.75 \cdot ft$	(User Input)
Pier Width Top =	$P_{w1} := 1.333 \cdot ft$	(User Input)
Pier Width Botttom =	$P_{w2} := 2.15 \cdot ft$	(User Input)
Pier Length =	$P_l := 2.08 \cdot ft$	(User Input)
Pier Projection Above Grade =	$P_P := 2.75 \cdot ft$	(User Input)
Pad Width 1 =	$Pd_{w1} := 4.5 \cdot ft$	(User Input)
Pad Width 2 =	$Pd_{w2} := 2.17 \cdot ft$	(User Input)
Pad Thickness =	$Pd_t := 2.0 \cdot ft$	(User Input)
Mat Width =	$Mat_w := 27 \cdot ft$	(User Input)
Mat Thickness =	$Mat_t := 3.5 \cdot ft$	(User Input)

Subgrade Properties:

Concrete Unit Weight =	$\gamma c := 150 \cdot pcf$	(User Input)
Water Unit Weight =	$\gamma w := 62.4 \cdot pcf$	(User Input)
Soil Unit Weight =	$\gamma s := 100 \cdot pcf$	(User Input)
Uplift Angle =	$\psi := 30.0 \cdot deg$	(User Input)
Soil Bearing Capacity =	$BC_{soil} := 9000 \cdot psf$	(User Input)

Calculated Data:

Volume of the Concrete Pads = $V_{pad} := Pd_{w1} \cdot Pd_{w2} \cdot Pd_t \cdot 4 = 78.12 \cdot ft^3$

Volume of the Concrete Piers = $V_{pier} := \frac{(P_{w1} + P_{w2})}{2} \cdot P_H \cdot P_l \cdot 4 = 39.85 \cdot ft^3$

Volume of the Concrete Mat = $V_{mat} := \left(Mat_w{}^2 \cdot Mat_t\right) = 2551 \cdot ft^3$

Total Volume of Concrete = $V_{Conc} := V_{pad} + V_{mat} + V_{pier} = 2669 \cdot ft^3$

Mass of Concrete = $Mass_{Conc} := V_{Conc} \cdot \gamma c = 400.4 \cdot kips$

Check Overturning:

Overturning Moment = $OM := Uplift \cdot d_{uplift} + Shear \cdot \left(P_H + Mat_t\right) = 3465.6 \cdot kip \cdot ft$

Resisting Moment = $RM := Comp \cdot d_{comp} + Mass_{Conc} \cdot \frac{Mat_w}{2} = 5763.3 \cdot kip \cdot ft$

Required Factor of Safety = $F_S := 1.0$

$ActualFS := \frac{RM}{OM} = 1.66$

$Uplift\_Check := if\left(\frac{RM}{OM} \geq F_S, \text{"OK"}, \text{"Overstressed"}\right)$

$Uplift\_Check = \text{"OK"}$

Check Bearing:

Cross Sectional Area of Mat = $A_{mat} := Mat_w{}^2 = 729 ft^2$

Section Modulus of Mat = $S_{mat} := \frac{(Mat_w)^3}{6} = 3280 \cdot ft^3$

$Bearing := \frac{Comp + Mass_{Conc}}{A_{mat}} + \frac{OM}{S_{mat}} = 1.8 \cdot ksf$

$Bearing\_Check := if\left(Bearing \leq BC_{soil}, \text{"OK"}, \text{"No Good"}\right)$

$Bearing\_Check = \text{"OK"}$

Section 1 - RFDS GENERAL INFORMATION

RFDS NAME:	S2117	DATE:	5/19/2014	RF DESIGN ENG:	Radu Alecsandru	RF PERF ENG:	
ISSUE:	Pre-construction	Approved? (Y/N)	Y	RF DESIGN PHONE:	ra9161@att.com	RF PERF PHONE:	
REVISION:	v04	RF MANAGER:	Cameron Syme	RF DESIGN EMAIL:	860-513-7598	RF PERF EMAIL:	
INITIATIVE / PROJECT:	Pre-construction RFDS for leasing and zoning purposes, general design. It is not the finalized location, CL and azimuths.					TRIDENT:	
						GSM FREQUENCY:	
						UMTS FREQUENCY:	
						LTE FREQUENCY:	
						I-PLAN JOB NUMBER:	

Section 2 - LOCATION INFORMATION

USID:		FA LOCATION CODE:		LOCATION NAME:	Meriden - Edgemark Acres	ORACLE PROJECT #:	
REGION:	NE	MARKET CLUSTER:	CT	MARKET:	NER	SEARCH RING NAME:	Meriden - Edgemark Acres
ADDRESS:.	200 Edgemark Acres	CITY:	Meriden	STATE:	CT	SEARCH RING ID:	S2117
ZIP CODE:		COUNTY:		MSA/RSA:		BTA:	
LATITUDE (D-M-S):	41°31'51.74"N	LONGITUDE (D-M-S):	72°50'33.64"W	LAT (DEC. DEG.):		LONG (DEC. DEG.):	
DIRECTIONS, ACCESS AND EQUIPMENT LOCATION:						BORDER CELL WITH CONTOUR COORD:	
						AM STUDY REQ'D (Y/N):	
						FREQ COORD:	

Section 3 - LICENSE COVERAGE/FILING INFORMATION

CGSA - NO FILING TRIGGERED:		CGSA LOSS:		PCS REDUCED - UPS ZIP:	
CGSA - MINOR FILING NEEDED:		CGSA EXT AGMT NEEDED:		PCS POPS REDUCED:	
CGSA - MAJOR FILING NEEDED:		CGSA SCORECARD UPDATED:			

Section 4 - TOWER/REGULATORY INFORMATION

STRUCTURE AT&T OWNED?:		GROUND ELEVATION:		STRUCTURE TYPE:		MARKET LOCATION 850 MHZ CALL SIGN(S):	
ADDTIONAL REGULATORY?:		HEIGHT OVERALL:		FCC ASR NUMBER:		MARKET LOCATION 1900 MHZ CALL SIGN(S):	
SUB-LEASE RIGHTS?:		STRUCTURE HEIGHT:				MARKET LOCATION 700 MHZ CALL SIGN(S):	
LIGHTING TYPE:						MARKET LOCATION AWS MHZ CALL SIGN(S):	

Section 5 - E-911 INFORMATION

	PSAP NAME:	PSAP ID:	E911 PHASE:	MPC SVC PROVIDER:	LMU REQUIRED:	ESRN:	DATE LIVE PH1:	DATE LIVE PH2:
ALPHA								
BETA								
GAMMA								
DELTA								
EPSILON								
PSI								

Section 6 - RBS GENERAL INFORMATION

4-DIGIT SITE ID:	S2117	COW OR TOY?:	No	CELLULAR NETWORK:		DISASTER PRIORITY:	
CELL SITE TYPE:	Sectorized	SITE TYPE:		OPS DISTRICT:		OPS ZONE:	
BTS LOCATION ID:		ORIGINATING CO:		RF DISTRICT:		RF ZONE:	

Section 7 - RBS SPECIFIC INFORMATION

	GSM RBSs	UMTS 1ST CARRIER RBSs	UMTS 2ND CARRIER RBSs	UMTS 3RD CARRIER RBSs	UMTS 4TH CARRIER RBSs	LTE RBSs
MSC						
BSC/RNC						
LAC						
RAC						
EQUIPMENT VENDOR						
EQUIPMENT TYPE						
LOCATION						
CABINET LOCATION						

Section 8 - RBS INDIVIDUAL INFORMATION

	GSM 850 RBS	GSM 1900 RBS	UMTS 850 RBS	UMTS 1900 RBS	UMTS 2ND 850 RBS	UMTS 2ND 1900 RBS	UMTS 3RD 850 RBS	UMTS 3RD 1900 RBS	UMTS 4TH 850 RBS	UMTS 4TH 1900 RBS	LTE 700 RBS	LTE AWS RBS
CELL ID/BCF												
CTS COMMON ID												

Section 9 - SOFT SECTOR ID

	GSM 850 RBS	GSM 1900 RBS	UMTS 850 RBS	UMTS 1900 RBS	UMTS 2ND 850 RBS	UMTS 2ND 1900 RBS	UMTS 3RD 850 RBS	UMTS 3RD 1900 RBS	UMTS 4TH 850 RBS	UMTS 4TH 1900 RBS	LTE 700 RBS	LTE AWS RBS
ALPHA (OR OMNI)												
BETA												
GAMMA												
DELTA												
EPSILON												
PSI												

Section 10 - CID/SAC

	GSM 850 RBS	GSM 1900 RBS	UMTS 850 RBS	UMTS 1900 RBS	UMTS 2ND 850 RBS	UMTS 2ND 1900 RBS	UMTS 3RD 850 RBS	UMTS 3RD 1900 RBS	UMTS 4TH 850 RBS	UMTS 4TH 1900 RBS	LTE 700 RBS	LTE AWS RBS
ALPHA (OR OMNI)												
BETA												
GAMMA												
DELTA												
EPSILON												
PSI												

Section 11 - CURRENT RADIO COUNTS (Existing)

	GSM 850 RBS	GSM 1900 RBS	UMTS 850 RBS	UMTS 1900 RBS	UMTS 2ND 850 RBS	UMTS 2ND 1900 RBS	UMTS 3RD 850 RBS	UMTS 3RD 1900 RBS	UMTS 4TH 850 RBS	UMTS 4TH 1900 RBS	LTE 700 RBS	LTE AWS RBS
ALPHA (OR OMNI)												
BETA												
GAMMA												
DELTA												
EPSILON												
PSI												

Section 12 - CURRENT T1 COUNTS (Existing)

	GSM 1st Cabinet	GSM 2nd Cabinet	UMTS 1st Cabinet	UMTS 2nd Cabinet	LTE 1st Cabinet	LTE 2nd Cabinet
# T1s						
LINK PROFILE						
FIBER or ETHERNET?						
Tx Board Model						
Tx Board QTY						
RAX/ECU Board Model						
RAX/ECU Board QTY						
BBU Board Model						
BBU Board QTY						
RRU - location						

Section 13 - NEW/PROPOSED RADIO COUNTS

	GSM 850 RBS	GSM 1900 RBS	UMTS 850 RBS	UMTS 1900 RBS	UMTS 2ND 850 RBS	UMTS 2ND 1900 RBS	UMTS 3RD 850 RBS	UMTS 3RD 1900 RBS	UMTS 4TH 850 RBS	UMTS 4TH 1900 RBS	LTE 700 RBS	LTE AWS RBS
ALPHA (OR OMNI)												
BETA												
GAMMA												
DELTA												
EPSILON												
PSI												

Section 14 - NEW/PROPOSED T1 COUNTS

	GSM 1st Cabinet	GSM 2nd Cabinet	UMTS 1st Cabinet	UMTS 2nd Cabinet	LTE 1st Cabinet	LTE 2nd Cabinet
# T1s						
LINK PROFILE						
FIBER or ETHERNET?						
Tx Board Model						
Tx Board QTY						
RAX/ECU Board Model						
RAX/ECU Board QTY						
BBU Board Model						
BBU Board QTY						
RRU - location						

Section 15A - CURRENT SECTOR/CELL INFORMATION - ALPHA (OR OMNI)

ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 5 GSM, UMTS (850 / 1900) or LTE (700 / AWS)
TX/RX?					
TECHNOLOGY					
FEEDERS (# /TYPE/LENGTH)					
ANTENNA MAKE - MODEL					
ANTENNA VENDOR					
ANTENNA SIZE H"xW"xD"					
ANTENNA WEIGHT					
ANTENNA GAIN					
AZIMUTH					
RADIATION CENTER					
ANTENNA TIP HEIGHT					
MAGNETIC DECLINATION					
ELECTRICAL TILT (700/850/1900/AWS)					
MECHANICAL DOWNTILT					
SCPA/MCPA?					
MCPA MODULES					
HATCHPLATE POWER (Watts)					
ERP (Watts)					
NARROW BAND LLC (QTY/MODEL)					
HYBRID COMBINER (QTY/MODEL)					
TMA/LNA (TYPE/MODEL)					
CURRENT INJECTORS FOR TMA					
CURRENT INJCTR POWER CABLE					
ANTENNA SHARING KIT?					
BAS Filter					
DIPLEXER (QTY/MODEL)					
DUPLEXER (QTY/MODEL)					
SURGE ARRESTOR (QTY/MODEL)					
DC BLOCK (QTY/MODEL)					
RET EQUIPMENT (QTY/MODEL)					
1900 PDU FOR TMAS					

Section 15B - CURRENT SECTOR/CELL INFORMATION - BETA

ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 5 GSM, UMTS (850 / 1900) or LTE (700 / AWS)
TX/RX?					
TECHNOLOGY					
FEEDERS (# /TYPE/LENGTH)					
ANTENNA MAKE - MODEL					
ANTENNA VENDOR					
ANTENNA SIZE H"xW"xD"					
ANTENNA WEIGHT					
ANTENNA GAIN					
AZIMUTH					
RADIATION CENTER					
ANTENNA TIP HEIGHT					
MAGNETIC DECLINATION					
ELECTRICAL TILT (700/850/1900/AWS)					
MECHANICAL DOWNTILT					
SCPA/MCPA?					
MCPA MODULES					
HATCHPLATE POWER (Watts)					
ERP (Watts)					
NARROW BAND LLC (QTY/MODEL)					
HYBRID COMBINER (QTY/MODEL)					
TMA/LNA (TYPE/MODEL)					
CURRENT INJECTORS FOR TMA					
CURRENT INJCTR POWER CABLE					
ANTENNA SHARING KIT?					
BAS Filter					
DIPLEXER (QTY/MODEL)					
DUPLEXER (QTY/MODEL)					
SURGE ARRESTOR (QTY/MODEL)					
DC BLOCK (QTY/MODEL)					
RET EQUIPMENT (QTY/MODEL)					
1900 PDU FOR TMAS					

Section 15C - CURRENT SECTOR/CELL INFORMATION - GAMMA

ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 5 GSM, UMTS (850 / 1900) or LTE (700 / AWS)
TX/RX?					
TECHNOLOGY					
FEEDERS (# /TYPE/LENGTH)					
ANTENNA MAKE - MODEL					
ANTENNA VENDOR					
ANTENNA SIZE H"xW"xD"					
ANTENNA WEIGHT					
ANTENNA GAIN					
AZIMUTH					
RADIATION CENTER					
ANTENNA TIP HEIGHT					
MAGNETIC DECLINATION					
ELECTRICAL TILT (700/850/1900/AWS)					
MECHANICAL DOWNTILT					
SCPA/MCPA?					
MCPA MODULES					
HATCHPLATE POWER (Watts)					
ERP (Watts)					
NARROW BAND LLC (QTY/MODEL)					
HYBRID COMBINER (QTY/MODEL)					
TMA/LNA (TYPE/MODEL)					
CURRENT INJECTORS FOR TMA					
CURRENT INJCTR POWER CABLE					
ANTENNA SHARING KIT?					
BAS Filter					
DIPLEXER (QTY/MODEL)					
DUPLEXER (QTY/MODEL)					
SURGE ARRESTOR (QTY/MODEL)					
DC BLOCK (QTY/MODEL)					
RET EQUIPMENT (QTY/MODEL)					
1900 PDU FOR TMAS					

Section 15D - CURRENT SECTOR/CELL INFORMATION - DELTA

ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 5 GSM, UMTS (850 / 1900) or LTE (700 / AWS)
TX/RX?					
TECHNOLOGY					
FEEDERS (# /TYPE/LENGTH)					
ANTENNA MAKE - MODEL					
ANTENNA VENDOR					
ANTENNA SIZE H"xW"xD"					
ANTENNA WEIGHT					
ANTENNA GAIN					
AZIMUTH					
RADIATION CENTER					
ANTENNA TIP HEIGHT					
MAGNETIC DECLINATION					
ELECTRICAL TILT (700/850/1900/AWS)					
MECHANICAL DOWNTILT					
SCPA/MCPA?					
MCPA MODULES					
HATCHPLATE POWER (Watts)					
ERP (Watts)					
NARROW BAND LLC (QTY/MODEL)					
HYBRID COMBINER (QTY/MODEL)					
TMA/LNA (TYPE/MODEL)					
CURRENT INJECTORS FOR TMA					
CURRENT INJCTR POWER CABLE					
ANTENNA SHARING KIT?					
BAS Filter					
DIPLEXER (QTY/MODEL)					
DUPLEXER (QTY/MODEL)					
SURGE ARRESTOR (QTY/MODEL)					
DC BLOCK (QTY/MODEL)					
RET EQUIPMENT (QTY/MODEL)					
1900 PDU FOR TMAS					

Section 15E - CURRENT SECTOR/CELL INFORMATION - EPSILON

ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 5 GSM, UMTS (850 / 1900) or LTE (700 / AWS)
TX/RX?					
TECHNOLOGY					
FEEDERS (# /TYPE/LENGTH)					
ANTENNA MAKE - MODEL					
ANTENNA VENDOR					
ANTENNA SIZE H"xW"xD"					
ANTENNA WEIGHT					
ANTENNA GAIN					
AZIMUTH					
RADIATION CENTER					
ANTENNA TIP HEIGHT					
MAGNETIC DECLINATION					
ELECTRICAL TILT (700/850/1900/AWS)					
MECHANICAL DOWNTILT					
SCPA/MCPA?					
MCPA MODULES					
HATCHPLATE POWER (Watts)					
ERP (Watts)					
NARROW BAND LLC (QTY/MODEL)					
HYBRID COMBINER (QTY/MODEL)					
TMA/LNA (TYPE/MODEL)					
CURRENT INJECTORS FOR TMA					
CURRENT INJCTR POWER CABLE					
ANTENNA SHARING KIT?					
BAS Filter					
DIPLEXER (QTY/MODEL)					
DUPLEXER (QTY/MODEL)					
SURGE ARRESTOR (QTY/MODEL)					
DC BLOCK (QTY/MODEL)					
RET EQUIPMENT (QTY/MODEL)					
1900 PDU FOR TMAS					

Section 15F - CURRENT SECTOR/CELL INFORMATION - ZETA

ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 5 GSM, UMTS (850 / 1900) or LTE (700 / AWS)
TX/RX?					
TECHNOLOGY					
FEEDERS (# /TYPE/LENGTH)					
ANTENNA MAKE - MODEL					
ANTENNA VENDOR					
ANTENNA SIZE H"xW"xD"					
ANTENNA WEIGHT					
ANTENNA GAIN					
AZIMUTH					
RADIATION CENTER					
ANTENNA TIP HEIGHT					
MAGNETIC DECLINATION					
ELECTRICAL TILT (700/850/1900/AWS)					
MECHANICAL DOWNTILT					
SCPA/MCPA?					
MCPA MODULES					
HATCHPLATE POWER (Watts)					
ERP (Watts)					
NARROW BAND LLC (QTY/MODEL)					
HYBRID COMBINER (QTY/MODEL)					
TMA/LNA (TYPE/MODEL)					
CURRENT INJECTORS FOR TMA					
CURRENT INJCTR POWER CABLE					
ANTENNA SHARING KIT?					
BAS Filter					
DIPLEXER (QTY/MODEL)					
DUPLEXER (QTY/MODEL)					
SURGE ARRESTOR (QTY/MODEL)					
DC BLOCK (QTY/MODEL)					
RET EQUIPMENT (QTY/MODEL)					
1900 PDU FOR TMAS					

Section 16A - NEW/PROPOSED SECTOR/CELL INFORMATION - ALPHA (OR OMNI)					
ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 5 GSM, UMTS (850 / 1900) or LTE (700 / AWS)
TX/RX?	TBD TBD	TBD TBD		TBD TBD	
TECHNOLOGY	UMTS-DB / LTE HB	LTE-DB		LTE-DB	
FEEDERS (# /TYPE/LENGTH)	4 / 1-5/8" CommScope / TBD '	4 / 1-5/8" CommScope / TBD '		4 / 1-5/8" CommScope / TBD '	
ANTENNA MAKE - MODEL	HPA-65R-BUU-H8	OPA-65R-LCUU-H8		HPA-65R-BUU-H8	
ANTENNA VENDOR	CCI	CCI		CCI	
ANTENNA SIZE H"xW"xD"	93 x 15 x 7	93 x 15 x 7		93 x 15 x 7	
ANTENNA WEIGHT	68	95		68	
ANTENNA GAIN	17.4 dBi (high band)	17.2 dBi (high band)		17.4 dBi (high band)	
AZIMUTH	0 °	0 °		0 °	
RADIATION CENTER	88	88 '		88 '	
ANTENNA TIP HEIGHT	92 '	92 '		92 '	
MAGNETIC DECLINATION					
ELECTRICAL TILT (700/850/1900/AWS)	0 °	0 °		0 °	
MECHANICAL DOWNTILT	0 °	0 °		0 °	
SCPA/MCPA?					
MCPA MODULES					
HATCHPLATE POWER (Watts)					
ERP (Watts)					
NARROW BAND LLC (QTY/MODEL)					
RRH	850 RRUS11/1900 RRUS12/1900 RRUS-A2	700 RRUS-E2/850 RRUS11/WCS RRUS32		700 RRUS11/1900 RRUS12/1900 RRUS-A2	
TMA/LNA (TYPE/MODEL)	CCI - TMABPDB7823VG12A x 2	CCI - TMABPDB7823VG12A x 2		CCI - TMABPDB7823VG12A x 2	
CURRENT INJECTORS FOR TMA	n/a	n/a		n/a	
CURRENT INJCTR POWER CABLE	n/a	n/a		n/a	
ANTENNA SHARING KIT?	n/a	n/a		n/a	
BAS Filter	n/a	n/a		n/a	
DIPLEXER (QTY/MODEL)	2 / Kaelus DBC2055F1V1-2	4 / Kaelus DBC2055F1V1-2		2 / Kaelus DBC2055F1V1-2	
DUPLEXER (QTY/MODEL)	n/a	n/a		n/a	
SURGE ARRESTOR (QTY/MODEL)	2 / Andrew APTDC-BDFDM-DBW	8 / Andrew APTDC-BDFDM-DBW		6 / Andrew APTDC-BDFDM-DBW	
DC BLOCK (QTY/MODEL)	n/a	n/a		n/a	
RET EQUIPMENT (QTY/MODEL)	n/a	n/a		n/a	
1900 PDU FOR TMAS	CCU - Kathrein 860 10006	n/a		n/a	

Section 16B - NEW/PROPOSED SECTOR/CELL INFORMATION - BETA					
ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 5 GSM, UMTS (850 / 1900) or LTE (700 / AWS)
TX/RX?	TBD TBD	TBD TBD		TBD TBD	
TECHNOLOGY	UMTS-DB / LTE HB	LTE-DB		LTE-DB	
FEEDERS (# /TYPE/LENGTH)	4 / 1-5/8" CommScope / TBD '	4 / 1-5/8" CommScope / TBD '		4 / 1-5/8" CommScope / TBD '	
ANTENNA MAKE - MODEL	HPA-65R-BUU-H8	OPA-65R-LCUU-H8		HPA-65R-BUU-H8	
ANTENNA VENDOR	CCI	CCI		CCI	
ANTENNA SIZE H"xW"xD"	93 x 15 x 7	93 x 15 x 7		93 x 15 x 7	
ANTENNA WEIGHT	68	95		68	
ANTENNA GAIN	17.4 dBi (high band)	17.2 dBi (high band)		17.4 dBi (high band)	
AZIMUTH	120 °	120 °		120 °	
RADIATION CENTER	88	88 '		88	
ANTENNA TIP HEIGHT	92 '	92 '		92 '	
MAGNETIC DECLINATION					
ELECTRICAL TILT (700/850/1900/AWS)	0 °	0 °		0 °	
MECHANICAL DOWNTILT	0 °	0 °		0 °	
SCPA/MCPA?					
MCPA MODULES					
HATCHPLATE POWER (Watts)					
ERP (Watts)					
NARROW BAND LLC (QTY/MODEL)					
RRH	850 RRUS11/1900 RRUS12/1900 RRUS-A2	700 RRUS-E2/850 RRUS11/WCS RRUS32		700 RRUS11/1900 RRUS12/1900 RRUS-A2	
TMA/LNA (TYPE/MODEL)	CCI - TMABPDB7823VG12A x 2	CCI - TMABPDB7823VG12A x 2		CCI - TMABPDB7823VG12A x 2	
CURRENT INJECTORS FOR TMA	n/a	n/a		n/a	
CURRENT INJCTR POWER CABLE	n/a	n/a		n/a	
ANTENNA SHARING KIT?	n/a	n/a		n/a	
BAS Filter	n/a	n/a		n/a	
DIPLEXER (QTY/MODEL)	2 / Kaelus DBC2055F1V1-2	4 / Kaelus DBC2055F1V1-2		2 / Kaelus DBC2055F1V1-2	
DUPLEXER (QTY/MODEL)	n/a	n/a		n/a	
SURGE ARRESTOR (QTY/MODEL)	2 / Andrew APTDC-BDFDM-DBW	8 / Andrew APTDC-BDFDM-DBW		6 / Andrew APTDC-BDFDM-DBW	
DC BLOCK (QTY/MODEL)	n/a	n/a		n/a	
RET EQUIPMENT (QTY/MODEL)	n/a	n/a		n/a	
1900 PDU FOR TMAS	CCU - Kathrein 860 10006	n/a		n/a	

Section 16C - NEW/PROPOSED SECTOR/CELL INFORMATION - GAMMA					
ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 5 GSM, UMTS (850 / 1900) or LTE (700 / AWS)
TX/RX?	TBD TBD	TBD TBD		TBD TBD	
TECHNOLOGY	UMTS-DB / LTE HB	LTE-DB		LTE-DB	
FEEDERS (# /TYPE/LENGTH)	4 / 1-5/8" CommScope / TBD '	4 / 1-5/8" CommScope / TBD '		4 / 1-5/8" CommScope / TBD '	
ANTENNA MAKE - MODEL	HPA-65R-BUU-H8	OPA-65R-LCUU-H8		HPA-65R-BUU-H8	
ANTENNA VENDOR	CCI	CCI		CCI	
ANTENNA SIZE H"xW"xD"	93 x 15 x 7	93 x 15 x 7		93 x 15 x 7	
ANTENNA WEIGHT	68	95		68	
ANTENNA GAIN	17.4 dBi (high band)	17.4 dBi (high band)		17.4 dBi (high band)	
AZIMUTH	240 °	240 °		240 °	
RADIATION CENTER	88	88 '		88 '	
ANTENNA TIP HEIGHT	92 '	92 '		92 '	
MAGNETIC DECLINATION					
ELECTRICAL TILT (700/850/1900/AWS)	0 °	0 °		0 °	
MECHANICAL DOWNTILT	0 °	0 °		0 °	
SCPA/MCPA?					
MCPA MODULES					
HATCHPLATE POWER (Watts)					
ERP (Watts)					
NARROW BAND LLC (QTY/MODEL)					
RRH	850 RRUS11/1900 RRUS12/1900 RRUS-A2	700 RRUS-E2/850 RRUS11/WCS RRUS32		700 RRUS11/1900 RRUS12/1900 RRUS-A2	
TMA/LNA (TYPE/MODEL)	CCI - TMABPDB7823VG12A x 2	CCI - TMABPDB7823VG12A x 2		CCI - TMABPDB7823VG12A x 2	
CURRENT INJECTORS FOR TMA	n/a	n/a		n/a	
CURRENT INJCTR POWER CABLE	n/a	n/a		n/a	
ANTENNA SHARING KIT?	n/a	n/a		n/a	
BAS Filter	n/a	n/a		n/a	
DIPLEXER (QTY/MODEL)	2 / Kaelus DBC2055F1V1-2	4 / Kaelus DBC2055F1V1-2		2 / Kaelus DBC2055F1V1-2	
DUPLEXER (QTY/MODEL)	n/a	n/a		n/a	
SURGE ARRESTOR (QTY/MODEL)	2 / Andrew APTDC-BDFDM-DBW	8 / Andrew APTDC-BDFDM-DBW		6 / Andrew APTDC-BDFDM-DBW	
DC BLOCK (QTY/MODEL)	n/a	n/a		n/a	
RET EQUIPMENT (QTY/MODEL)	n/a	n/a		n/a	
1900 PDU FOR TMAS	CCU - Kathrein 860 10006	n/a		n/a	

HexPort Multi-Band Antenna

Model HPA-65R-BUU-H8

Hexport Multi-Band Antenna Array

The CCI Hexport Multi-Band Antenna Array is an industry first 6-port antenna with full WCS Band Coverage. With four high band ports and two low band ports, our hexport antenna is ready for 4X4 high band MIMO.

Modern networks demand high performance, consequently CCI has incorporated several new and innovative design techniques to provide an antenna with excellent side-lobe performance, sharp elevation beams, and high front to back ratio.

Multiple networks can now be connected to a single antenna, reducing tower loading and leasing expense, while decreasing deployment time and installation cost.

Full band capability for 700 MHz , Cellular 850 MHz, PCS 1900 MHz, AWS 1710/2170 MHz and WCS 2300 MHz coverage in a single enclosure.

Benefits

- **Includes WCS Band**
- **Reduces tower loading**
- **Frees up space for tower mounted E-nodes**
- **Single radome with six ports**
- **All Band design simplifies radio assignments**
- **Sharp elevation beam eases network planning**

Features

- High Band Ports include WCS Band
- Four High Band ports with two Low Band ports in one antenna
- Sharp elevation beam
- Excellent elevation side-lobe performance
- Excellent MIMO performance due to array spacing
- Excellent PIM Performance
- A multi-network solution in one radome

Applications

- 4x4 MIMO on High Band and 2x2 MIMO on Low Band
- Adding additional capacity without adding additional antennas
- Adding WCS Band without increasing antenna count

CCI antennas
EXTENDING WIRELESS PERFORMANCE

HEXPORT Multi-Band ANTENNA

Model HPA-65R-BUU-H8

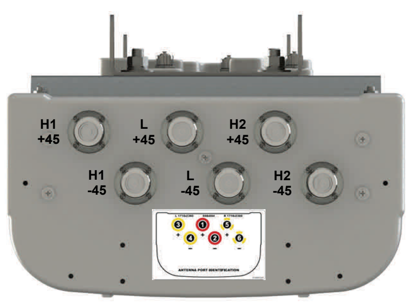
HPA-65R Multi-Band Antenna

Electrical Specifications

Frequency Range	2 X Low Band Ports which cover the full range from 698-894 MHz		4 X High Band Ports which cover the full range from 1710-2360 MHz			
	698-806 MHz	824-894 MHz	1850-1990 MHz	1710-1755/2110-2170 MHz		2305-2360 MHz
Gain	15.3 dBi	16.2 dBi	17.1 dBi	16.3 dBi	17.4 dBi	17.7 dBi
Azimuth Beamwidth (-3dB)	65°	61°	62°	68°	64°	60°
Elevation Beamwidth (-3dB)	10.1°	8.4°	5.6°	6.2°	5.0°	4.5°
Electrical Downtilt	2° to 10°	2° to 10°	0° to 8°	0° to 8°	0° to 8°	0° to 8°
Elevation Sidelobes (1st Upper)	< -17 dB	< -17 dB	< -19 dB	< -18 dB	< -18 dB	< -17 dB
Front-to-Back Ratio @180°	> 29 dB	> 28 dB	> 35 dB	> 35 dB	> 35 dB	> 35 dB
Front-to-Back Ratio over ± 20°	> 28 dB	> 27 dB	> 28 dB	> 27 dB	> 28 dB	> 28 dB
Cross-Polar Discrimination (at Peak)	> 24 dB	> 20 dB	> 25 dB	> 25 dB	> 25 dB	> 25 dB
Cross-Polar Discrimination (at ± 60°)	> 16 dB	> 14 dB	> 18 dB	> 18 dB	> 18 dB	> 18 dB
Cross-Polar Port-to-Port Isolation	> 25 dB	> 25 dB	> 25 dB	> 25 dB	> 25 dB	> 25 dB
VSWR	< 1.5:1	< 1.5:1	< 1.5:1	< 1.5:1	< 1.5:1	< 1.5:1
Passive Intermodulation (2x20W)	≤ -150dBc	≤ -150dBc	≤ -150dBc	≤ -150dBc	≤ -150dBc	≤ -150dBc
Input Power	500 Watts CW	500 Watts CW	300 Watts CW	300 Watts CW	300 Watts CW	300 Watts CW
Polarization	Dual Pol 45°	Dual Pol 45°	Dual Pol 45°	Dual Pol 45°	Dual Pol 45°	Dual Pol 45°
Input Impedance	50 Ohms	50 Ohms	50 Ohms	50 Ohms	50 Ohms	50 Ohms
Lightning Protection	DC Ground	DC Ground	DC Ground	DC Ground	DC Ground	DC Ground

Mechanical Specifications

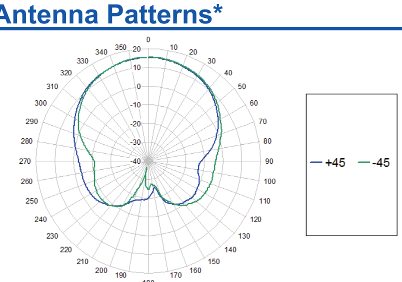
Dimensions (LxWxD)	92.4 x 14.8 x 7.4 inches (2348 x 376 x 189 mm)
Survival Wind Speed	> 150 mph
Front Wind Load	332 lbs (1479 N) @ 100 mph (161 kph)
Side Wind Load	193 lbs (860 N) @ 100 mph (161 kph)
Equivalent Flat Plate Area	13.0 ft^2 (1.2 m^2)
Weight (without Mounting)	68 lbs (31 kg)
RET System Weight	5.0 lbs (2.25 kg)
Connector	6; 7-16 DIN female long neck
Mounting Pole	2-5 inches (5-12 cm)



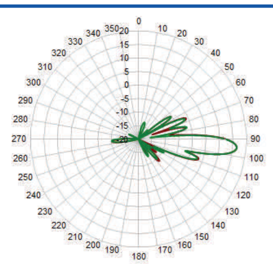
Bottom View

Rear View

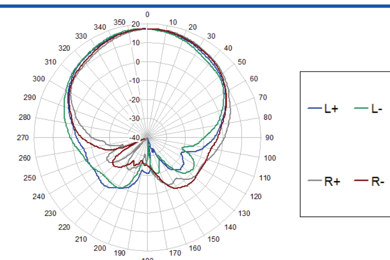
Antenna Patterns*



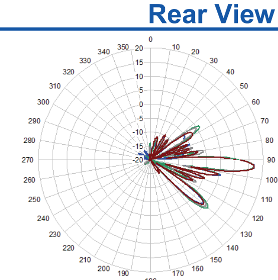
894 MHz Azimuth



Elevation 5°



1920 MHz Azimuth



Elevation 4°

*Typical antenna patterns. For detail information on antenna pattern, please contact us at info@cciproducts.com. All specifications are subject to change without notice.

65° OctoPort Multi-Band Antenna

Model OPA-65R-LCUU-H8

Octoport Multi-Band Antenna Array

The CCI Octoport Multi-Band Antenna Array is an industry first 8-port antenna with full WCS Band Coverage. With four high band ports covering PCS, AWS and WCS bands, two 700 MHZ ports, and two 850 MHz ports our octoport antenna is ready for 4X4 high band MIMO.

Modern networks demand high performance, consequently CCI has incorporated several new and innovative design techniques to provide an antenna with excellent side-lobe performance, sharp elevation beams, and high front to back ratio.

Multiple networks can now be connected to a single antenna, reducing tower loading and leasing expense, while decreasing deployment time and installation cost.

Full band capability for 700 MHz , Cellular 850 MHz, PCS 1900 MHz, AWS 1710/2155 MHz and WCS 2300 MHz coverage in a single enclosure.

All CCI antennas are manufactured under ISO 9001.

Benefits

- **RET System allows Independent Tilt of each band specific paired port**
- **Reduces tower loading**
- **Frees up space for tower mounted Remote Radio Heads**
- **Single radome with eight ports**
- **All Band design simplifies radio assignments**
- **Sharp elevation beam eases network planning**

Features

- High Band Ports include WCS Band
- Four High Band ports with four Low Band ports in one antenna
- Sharp elevation beam
- Excellent elevation side-lobe performance
- Excellent MIMO performance due to array spacing
- Excellent PIM Performance
- A multi-network solution in one radome

Applications

- 4x4 MIMO on High Band and Dual 2x2 MIMO on 700 & 850 Low Bands
- Adding additional capacity without adding additional antennas
- Adding WCS Band without increasing antenna count

65° OctoPort Multi-Band Antenna

Model OPA-65R-LCUU-H8

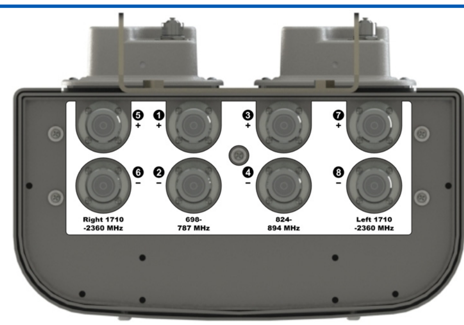
OPA-65R Multi-Band Antenna

Electrical Specifications

Frequency Range	2 X Low Band Ports (L) which cover the range from 698-787 MHz	2 X Low Band Ports (C) which cover the range from 824-894 MHz	4 X High Band Ports (H1 & H2) which cover the full range from 1710-2360 MHz		
			1850-1990 MHz	1710-1755/2110-2170 MHz	2305-2360 MHz
Gain	14.7 dBi	15.5 dBi	17.0 dBi	16.5 dBi	17.2 dBi	17.1 dBi
Azimuth Beamwidth (-3dB)	65°	61°	62°	67°	64°	61°
Elevation Beamwidth (-3dB)	10.1°	8.5°	5.6°	6.2°	5.0°	4.5°
Electrical Downtilt	2° to 10°	2° to 10°	0° to 8°	0° to 8°	0° to 8°	0° to 8°
Elevation Sidelobes (1st Upper)	< -17 dB	< -17 dB	< -19 dB	< -18 dB	< -18 dB	< -17 dB
Front-to-Back Ratio @180°	> 28 dB	> 28 dB	> 35 dB	> 35 dB	> 35 dB	> 35 dB
Front-to-Back Ratio over ± 20°	> 28 dB	> 27 dB	> 28 dB	> 27 dB	> 27 dB	> 28 dB
Cross-Polar Discrimination (at Peak)	> 24 dB	> 20 dB	> 25 dB	> 25 dB	> 25 dB	> 25 dB
Cross-Polar Discrimination (at ± 60°)	> 16 dB	> 14 dB	> 18 dB	> 18 dB	> 18 dB	> 18 dB
Cross-Polar Port-to-Port Isolation	> 25 dB	> 25 dB	> 25 dB	> 25 dB	> 25 dB	> 25 dB
VSWR	< 1.5:1	< 1.5:1	< 1.5:1	< 1.5:1	< 1.5:1	< 1.5:1
Passive Intermodulation (2x20W)	≤ -150 dBc	≤ -150 dBc	≤ -150 dBc	≤ -150 dBc	≤ -150 dBc	≤ -150 dBc
Input Power	500 Watts CW	500 Watts CW	300 Watts CW	300 Watts CW	300 Watts CW	300 Watts CW
Polarization	Dual Pol 45°	Dual Pol 45°	Dual Pol 45°	Dual Pol 45°	Dual Pol 45°	Dual Pol 45°
Input Impedance	50 Ohms	50 Ohms	50 Ohms	50 Ohms	50 Ohms	50 Ohms
Lightning Protection	DC Ground	DC Ground	DC Ground	DC Ground	DC Ground	DC Ground

Mechanical Specifications

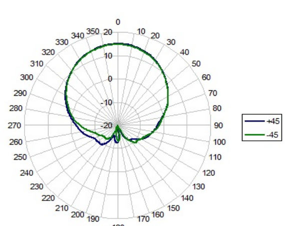
Dimensions (LxWxD)	92.7 x 14.4 x 7.0 inches (2355 x 366 x 179 mm)
Survival Wind Speed	> 150 mph
Front Wind Load	327 lbs (1453 N) @ 100 mph (161 kph)
Side Wind Load	186 lbs (829 N) @ 100 mph (161 kph)
Equivalent Flat Plate Area	12.9 ft^2 (1.2 m^2)
Weight (w/o RET/Mounting)	88 lbs (40 kg)
RET System Weight	7.0 lbs (3.0 kg)
Connector	8; 7-16 DIN female long neck
Mounting Pole	2-5 inches (5-12 cm)



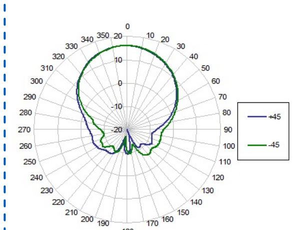
Bottom View

Rear View

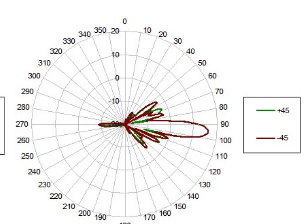
Antenna Patterns*



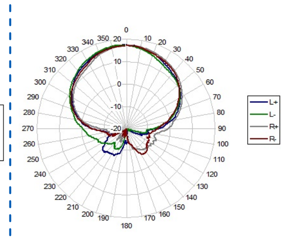
737 MHz Azimuth



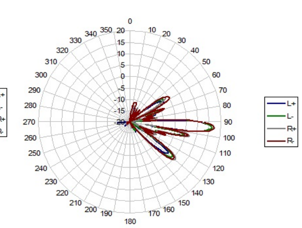
887 MHz Azimuth



Elevation 5°



1920 MHz Azimuth



Elevation 4°

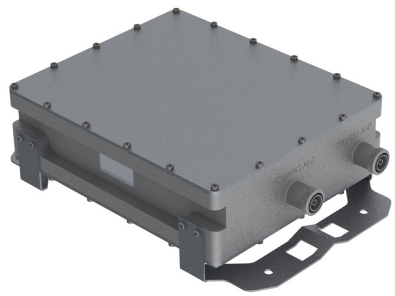
*Typical antenna patterns. For detail information on antenna pattern, please contact us at info@cciproducts.com. All specifications are subject to change without notice.

USA HQ: 89 Leuning Street, South Hackensack, NJ 07606 Telephone: 201-342-3338,
Canada: 411 Legget Drive, Suite 104, Ottawa, ON, Canada K2K 3C9 Telephone: 613-591-6696

Triple Band (AWS/PCS/WCS) Twin TMA with 700/850 Bypass

Tel: 201-342-3338 Fax: 201-342-3339 www.cciproducts.com

General Information



CCI's Triple Band TMA with 700/850 bypass contains two triple band TMA's in a single housing. The TMA's are fully duplexed and share a single LNA for all three bands. The bypass path provides excellent isolation to the TMA path. Separate antenna ports for the bypass path and TMA path are combined onto a single BTS port. Low noise high linearity amplifiers improve the uplink sensitivity and the receive performance of base stations. The TMA is fully compliant with the latest AISG 2.0 specification. The TMA supports CDMA, EDGE/GSM, UMTS and LTE BTS equipment. The TMA is ideally suited for sites upgraded to quad-band using the existing infrastructure. The TMA allows the sharing of feeder lines for both AWS and PCS bands thus reducing tower loading, leasing, and installation costs. The input and output connectors are located inline for ease of installation in space constrained areas such as uni-pole structures and stealth antennas.

ModelTMABPDB7823VG12A

Contents:

Features:

- Small lightweight unit
- Triple Band (AWS/PCS/WCS) Twin TMA with 700/850 Bypass
- Independent Gain Control
- High linearity
- Lightning protected
- Fail-safe bypass mode
- High reliability

Technical Description

The TMA system is an outdoor quad band tower mount unit which provides low noise amplification of PCS, AWS, and WCS uplink signals combined with 700/850 bypassed signals from separate antenna ports to a common BTS port. The tower mount unit consists of 14 band-pass filters, two redundant low noise amplifiers (LNA) with bypass failure circuitry, two bias tees, AISG control circuitry, and lightning protection circuitry all housed in an IP68 enclosure suited to long life masthead mounting. The AWS, PCS and WCS paths are dual duplexed to separate the low power uplink signals from the high power down link signals at the BTS and antenna ports. The AWS, PCS, and WCS uplink signals are amplified with a dedicated ultra-low noise PHEMT LNA with adjustable gain control. The unit provides protection against lightning strikes via a multistage surge protection circuit. DC power and AISG 2.0 control is provided via the BTS feeder cable. The unit operates in current window alarm (CWA) mode until a valid AISG message is detected, at which point it automatically switches to AISG mode. Once in AISG mode, the unit can only switch back to CWA mode with the receipt of an AISG CCI vendor defined command. In CWA mode, the unit requires 12VDC at each BTS port and follows typical current window convention. In AISG mode, the unit will accept 10-30 VDC from either BTS port. In AISG mode, the unit does not require an AISG 2.0 compatible site control unit (SCU) and may also be powered by a standard power distribution unit (PDU).

An optional Site Control Unit (SCU) is available to power up to 32 AISG modules per sector and to provide the monitoring and alarm functions for the system. The SCU is housed in a single (1U) 1.75" x 19" rack and contains dual redundant power supplies capable of being "hot swapped" that provide a regulated DC supply voltage on the RF coax for the tower mount amplifiers.

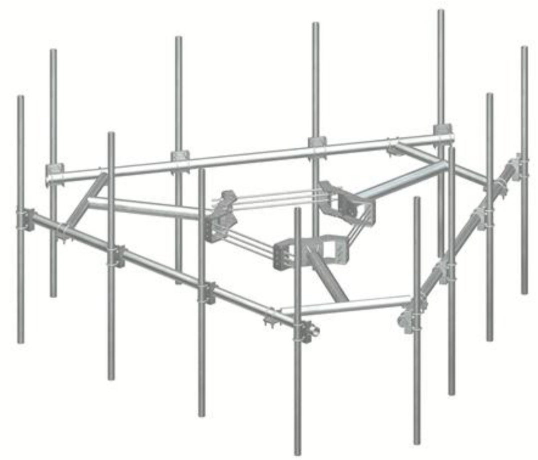
CCI Triple Band (AWS/PCS/WCS) Twin TMA with 700/850 Bypass Typical Specifications

Description	Typical Specifications			
Electrical Specifications	**700/850**	**PCS**	**AWS**	**WCS**
Receive Frequency Range	-	1850 – 1910 MHz	1710 – 1755 MHz	2305 – 2320 MHz
Transmit Frequency Range	-	1930 – 1990 MHz	2110 – 2155 MHz	2345 – 2360 MHz
Bypass Frequency Range	698 - 894 MHz	-	-	-
Amplifier Gain	-	6 to 12 dB Adjustable in 0.25 dB steps via AISG	6 to 12 dB Adjustable in 0.25 dB steps via AISG	6 to 12 dB Adjustable in 0.25 dB steps via AISG
Gain Variation	-	±1.0 dB	±1.0 dB	±1.0 dB
System Noise Figure	-	1.4 dB Typ.	1.3 dB Typ.	1.3 dB Typ.
Input Third Order Intercept Point	-	+12 dBm Min at Max. Gain		
Input / Output Return Loss	18 dB Min all ports, 12 dB Min. Bypass Mode			
Insertion Loss	0.25 dB Typ.			
Transmit Passband	-	0.5 dB Typical	0.4 dB Typical	0.4 dB Typical
Bypass Mode, (PCS/AWS/WCS) Rx Passband	-	2.5 dB Typ.	2.5 dB Typ.	2.5 dB Typ.
Filter Characteristics				
Continuous Average Power	200 Watts max			
Peak Envelope Power	2 KW max			
Intermodulation Performance				
IMD at ANT port in Rx Band	< -112 dBm (-155 dBc) [2 tones at +43 dBm]			
Operating Voltage	+10V to +30V DC provided via coax or AISG			
Power Consumption	<2.0 Watts			
Mechanical Specifications				
Connectors	DIN 7-16 female x 2; AISG x 1			
Dimensions (Body Only)	10.63” (H) x 11.024” (W) x 3.72” (D); (290.60 (H) x 280.00 (W) x 95.0 (D) mm)			
Dimensions (with Conn. & Bracket)	14.25” (H) x 11.024” (W) x 4.11” (D); (362.00 (H) x 280.00 (W) x 104.40 (D) mm)			
Weight	23.1 Lbs. (10.5 Kg) - with Brackets; 22 Lbs. (10 Kg) - without brackets			
Mounting	Pole/Wall Mounting Bracket			
Environmental Specifications				
Operating Temperature	-40˚ C to +65˚C			
Lightning Protection	8/20us, ±2KA max, 10 strikes each, IEC61000-4-5			
Enclosure	IP68			
MTBF	>500,000 hours			

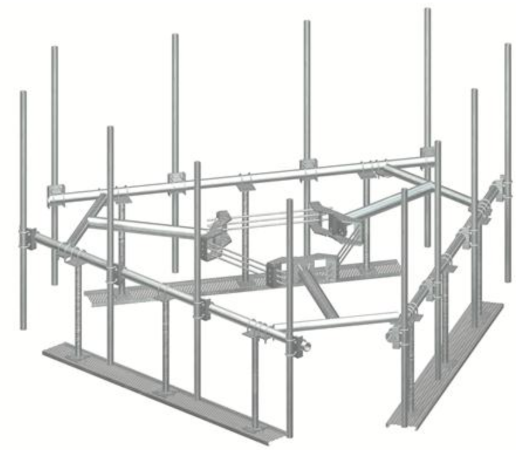
All specifications are subject to change. The latest specifications are available at www.cciproducts.com

Ultra-Low Profile Monopole Mounts

NEW



Kit includes everything shown.



Shown with optional work support platforms (3).

Ultra-Low Profile Monopole Mounts

- Engineered specifically for 4G (RRU) build outs.
- Increased capacity without an inflated price.
- Low Profile design for reduced tower loading.
- Easily adaptable to include work platforms.
- All round members reduce the risk of migratory bird nesting.
- Complete kits include everything shown. Note: NP versions include antenna pipe mounting hardware.

Part #	Pole Diameter	Face Width	Mounting Pipes	Price
ULP12-NP	12″ - 45″	12′-6″	(12) 2-3/8″ x 63″	**$2,425.00**
ULP12-472	12″ - 45″	12′-6″	(12) 2-3/8″ x 72″	**$2,785.00**
ULP12-484	12″ - 45″	12′-6″	(12) 2-3/8″ x 84″	**$2,810.00**
ULP12-496	12″ - 45″	12′-6″	(12) 2-3/8″ x 96″	**$2,830.00**
ULP14-NP	12″ - 45″	14′-6″	No Antenna Pipes	**$2,465.00**
ULP14-472	12″ - 45″	14′-6″	(12) 2-3/8″ x 72″	**$2,825.00**
ULP14-484	12″ - 45″	14′-6″	(12) 2-3/8″ x 84″	**$2,845.00**
ULP14-496	12″ - 45″	14′-6″	(12) 2-3/8″ x 96″	**$2,870.00**
RM-ADK	Large-Pole Adapter Kit	Adapter Kit 45″ - 60″		**$380.00**
WP197-10	10′ Work Support Platform			**$315.00**